

THE FLORA OF NORFOLK ISLAND.

PART I.

BY J. H. MAIDEN, GOVERNMENT BOTANIST OF NEW SOUTH WALES,
AND DIRECTOR OF THE BOTANIC GARDENS, SYDNEY.

(Plate xxxviii.)

SYNOPSIS.

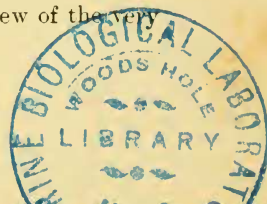
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In the years 1804 and 1805 Ferdinand Bauer visited Norfolk Island (*infra*, p. 778), and his collections and drawings were submitted to Endlicher, of Vienna, who in 1833 published a Prodromus of the plants, describing a number of new species. In 1830, Allan Cunningham visited the Island and added to our knowledge of its botany; his notes were posthumously published by Heward. Thenceforward notes on the botany of the Island, usually of a popular character, were published by various authors noted in the Bibliography. In 1885, the late Baron von Mueller published, in the 'Journal of Botany,' notes on the botany of the Island based upon specimens collected by Mr. Isaac Robinson, then, as now, resident agent for the Sydney Botanic Gardens. Since I have had control of this establishment, I have, chiefly with Mr. Robinson's aid, continuously made collections of the flora. To Mr. Robinson's work I am highly indebted. Before publishing, I determined to visit the Island, not only to endeavour to clear up a number of difficulties that had presented themselves, but also to see if I could find any plants not hitherto recorded. I have recounted my results as regards the first object during the course of the paper. As regards the second object, I desire to refer my readers to the summary of results.

I visited the Island in November, 1902, after a period of (for the Island) severe drought, hence the time was unsuitable for some species; at the same time the great dryness enabled me to visit situations that would have been difficult of access in a wet or even a normal season. I was accompanied by Mr. J. L. Boorman, Collector for the Botanic Gardens, whose zeal in this service is worthy of the highest praise.

It being obvious that it is essential that deductions as to the origin and distribution of a flora should be based on accurate determinations of the species, I desire to say that this Part chiefly concerns itself with systematic work; I have a few queries which are not yet settled, and when this is done to my satisfaction I hope to submit the deductions referred to.

As it is seventy years since Endlicher's valuable though incomplete Flora of the Island was published, and in view of the very



scattered literature of the botany of this very interesting ocean island, I trust that the present contribution may be found useful.

"Stick" is the term used in Norfolk Island for what on the mainland is universally known as the "bush."

SECTION i.

A. PHANEROGAMÆ.

i. ANGIOSPERMÆ.

a. Dicotyleæ.

RANUNCULACEÆ.

1. CLEMATIS GLYCINOIDES, DC.—New for the Island.

"*Clematis indivisa*, Willd., in Dec., Prod. v. 1, p. 5. *C. integrifolia*, Forst. non Linn. Common on the Cascade Road," is quoted from Allan Cunningham's Notes by Heward (10, p. 121) as having been found by Cunningham in Norfolk Island, but I did not find it. Perhaps a slip of the pen for *C. glycinoides*, DC.

"*C. cocculifolia*, A. Cunn., in Ann. Nat. Hist. ser. i. iv. 260, from Norfolk Island. . . . has most of the leaves simple and orbicular" (B.Fl. i. p. 7). This is a New Zealand species, and its occurrence on Norfolk Island should be confirmed.

2. RANUNCULUS PARVIFLORUS, Linn.—In mud at the Cockpit and in many other places. New for the Island.

MAGNOLIACEÆ.

Drimys Howeana, F.v.M., Fragm. vii. 17, is recorded from Norfolk Island by Tate. I have not seen a specimen.

MENISPERMACEÆ.

Stephania discolor, Spreng., Syst. iv. Cur. Post. 316 (*S. hernandiefolia*, Walp.*), occurs in Lord Howe Island and in many places to the north of Norfolk Island, but I am not aware that it has been recorded for the latter Island.

* This name is given in B.Fl. i. 57, and in "Die Flora der Deutscher Schutzgebiete in der Südsee" (Schumann and Lauterbach).

CRUCIFERÆ.

3. *NASTURTIUM SYLVESTRE*, R.Br., "in Hort. Kew. v. 4, p. 110, Ed. 2, Eng. Bot. t. 2324. Wet ravines and running streams" (A. Cunn., in Heward).

4. *CAKILE MARITIMA*, Scop.—New for the Island.

CAPPARIDEE.

5. *CAPPARIS NOBILIS*, F.v.M. (Syn. *Busbeckia nobilis*, Endl., Prod. Norf. 64; *Capparis citrina*, A. Cunn., London Journ. Bot. i. 115, 1842).

Capparis nobilis, F.v.M., B.Fl. i. 95, 1863, refers to "a small tree." Endlicher says "Frutex an arbuscula?" he being evidently in doubt. The Norfolk Island plant (found also in Phillip Island, see p. 784) is in fact a stout scrambling climber, with a stem 3 inches in diameter, and of indefinite length, forming a liana amongst the trees at Ball's Bay.

The differences between the Norfolk Island and Australian Capparides are here stated:—

NORFOLK ISLAND.

Tall, scrambling or climbing shrub.

Leaves: proportion of length to breadth 2 to 1.

Inflorescence terminal in all specimens, though described as flowers on solitary axillary peduncles or in terminal racemes by reduction of the leaves.

Flower buds rather more pointed. Colour of the flowers pale yellow.

Fruit almost globular.

AUSTRALIA.

Erect, tall shrub or tall tree.

Leaves: proportion of length to breadth 3 to 1 or narrower. (One broad-leaved specimen from Queensland in the National Herbarium, Sydney).

Inflorescence more frequently axillary, the peduncles frequently in pairs.

Buds more globular, though often pointed. Colour white.

Fruit lemon-shaped, often with crested ridges.

The difference between the two *Capparides* appears to be more in habit than in any essential character, so that it may be a matter of opinion whether they should be looked upon as distinct species or only varieties.

In my opinion the name *C. nobilis* should be retained for the Norfolk Island plant, and *C. arborea* (F.v.M., Fragm. i. 163) for the mainland one until it is shown that the two are identical.

C. ornans, F.v.M., is a Queensland plant (from Port Denison) closely allied to *C. nobilis*, and is, like the Norfolk Island one, a woody climber. The position of this species should also be enquired into, although according to Bentham they belong to different sections of the genus.

In the Index Kewensis we have *Busbeckia arborea*, F. Muell., Fragm. i. 163 = *Capparis nobilis*.

Busbeckia nobilis, Endl., Prod. Fl. Ins. Norf. 64 = *C. ornans*, but I do not know on what authority. Bailey, 'Queensland Flora,' does not touch on the point, and I have not sufficient material to clear up the whole matter.

Pax (in Pfl. Famil.) divides *Capparis* into 14 sections. He has:—

"Sect. xii. *Busbeckia*, Benth., to which belongs the typical *C. elegans*, (Endl.) F.v.M., upon which Endlicher has founded his genus *Busbeckia*, from Norfolk Island and Australia."

Capparis elegans, (Endl.) F.v.M., must be a clerical error; in my opinion Pax meant to write *C. nobilis*, (Endl.) F.v.M. In Endlicher's Prod., the plant is called *Busbeckia nobilis*, Endl., as already stated, and *Capparis* or *Busbeckia elegans* is nowhere to be found.

VIOLACEÆ.

6. HYMENANTHERA LATIFOLIA Endl., Prod. Norf. 127.—This is one of the small trees known as "Beech" on the Island.

"*Hymenanchera oblongifolia*, A. Cunn. MSS. (nov.sp.) foliis oblongis, basi attenuatis petiolatis, margine calloso-denticulatis. A slender shrub bearing fruit in July, on the skirts of woods at Long Ridge, at the junction of the old cross road leading to Cascade Road" (A. Cunn. in Heward, 10 p. 124).

This is a synonym of *H. dentata*, R.Br., but I think that a second species of *Hymenanthera* has not been proved to occur on the Island.

7. *MELICYTUS RAMIFLORUS*, R. & G. Forster.—Recorded for the Island by Sir Joseph Hooker in Handbook of N.Z. Flora, p. 17, and later by Mueller (Journ. Bot. xxiii. 354). It is a tree of the habit of the better known *Olea apetala* (Ironwood).

8. *VIOLA BETONICÆFOLIA*, Sm.—Recorded in B.Fl. i. 99, as having been collected by Backhouse.

PITTOSPOREÆ.

9. *PITTOSPORUM BRACTEOLATUM*, Endl., Prod. Norf. p. 78.—This bears the absurd name of "Oleander" on the Island.

FRANKENIACEÆ.

10. *FRANKENIA PAUCIFLORA*, DC.—New for the Island.

PLUMBAGINEÆ.

11. *PLUMBAGO ZEYLANICA*, Linn., Endl., Prod. Norf. 87.—Found by A. Cunningham on Phillip Island also. This species extends from the East Indies through the Malay Archipelago to Australia and the Pacific Islands (including the Sandwich Islands). At the same time, bearing in mind that for so many years this has been extensively distributed as an ornamental plant by the Sydney Botanic Gardens, a word of caution is necessary in accepting it as indigenous in some of the Pacific Islands.

GUTTIFEREÆ.

Calophyllum inophyllum, Linn.—I was told that this tree is found on the Island, but I could not find it and would suggest that the foliage of *Ochrosia* has been taken for it.

MALVACEÆ.

12. *MALVASTRUM TRICUSPIDATUM*, A. Gray.—New for the Island.

13. *ABUTILON JULIANÆ*, Endl., Prod. Norf. 135.—This rare endemic plant I found in only two localities, which need not be particularised. It is a shrub about 4 feet high, and as cattle are fond of it and roam freely, it is in some danger of extinction. I brought cuttings to endeavour to introduce it to cultivation. It is not of horticultural value.

14. *HIBISCUS DIVERSIFOLIUS*, Jacq., Endl., Prod. Norf. 133.

15. *HIBISCUS TILIACEUS*, Linn., Endl., Prod. Norf. 131.

16. *HIBISCUS INSULARIS*, Endl., Prod. Norf. 132.—Found only on Phillip Island (called Pig Island by Endlicher). A few stilt-like plants remain, almost the last of the vegetation.

17. *LAGUNARIA PATERSONII*, Don, Endl., Prod. Norf. 134 (with a full synonymy).—Found also on Phillip Island (A. Cunn. in London Journ. Bot. i. 116).

“Scattered on the grassy hills it forms a spreading tree of forty feet in height; it is here called White Oak; its leaves are of a whitish green, and its flowers pink, fading to white, the size of a wine-glass. It is perhaps the largest plant known to exist, belonging to the Mallow tribe. In a thick wood I met with it eighty feet high, and with a trunk sixteen and a half feet round” (Backhouse, p. 258).

It is valueless for economic purposes except as an inferior fire-wood, it being one of the few woods of the Island little used for that or any other purpose. Trees 5 feet in diameter are common. It has very large, handsome flowers of a very deep pink, much more ornamental than those of the same species on the mainland, which is var. *bracteata*, Benth., B.Fl. i. 218.

STERCULIACEÆ.

18. *UNGERIA FLORIBUNDA*, Schott & Endl.—“Bastard Oak” [probably in comparison with the “White Oak” (*Lagunaria*)]. Endemic. A tree 40 feet in height and with a diameter of 18 inches to 2 feet. The saplings grow very straight and tough, and are hence used by the boys for fishing-rods.

LINEÆ.

19. *LINUM MARGINALE*, A. DC.—New for the Island.

GERANIACEÆ.

20. PELARGONIUM AUSTRALE.—New for the Island.

20 *bis*. GERANIUM DISSECTUM, Linn.—New for the Island.

RUTACEÆ.

21. EVODIA LITTORALIS, Endl., Prod. Norf. 146.—Found at “Now Now.” Called “Shade-tree” on the Island. Apparently rare. Originally recorded from Anson Bay. Bailey, ‘Queensland Flora,’ i. 201, diffidently records this species from Queensland also.

22. ACRONYCHIA ENDLICHERI, Schott. (Syn. *Vepris simplicifolia*, Endl., Prod. Norf. 148).—Called “Big or Dark Yellow Wood.”

23. XANTHOXYLUM BLACKBURNIA, Benth., B.Fl. i. 363. (Syn. *Blackburnia pinnata*, Forst., Charact. Gen. 6; Forst., Prod. p. 10. “Norfolciæ insula deserta,” Endl., Prod. Norf. 147.)

“Small or Hard Yellow Wood.” Formerly much used for making household furniture. Found also on Phillip Island.

Boronia Barkeriana, F.v.M.

Eriostemon ambiens, F.v.M. (*Phebalium ambiens*, F.v.M.).

Eriostemon Beckleri, F.v.M. (*P. Beckleri*, F.v.M.).

Bosistoa euodiformis, F.v.M.

These are four New South Wales species which have been copied into Prof. Tate’s List, probably through a clerical error. *Bosistoa euodiformis* and *Eriostemon Beckleri* are from the mainland, and may possibly be found on the Island, although I think it is very unlikely. The other two species are more unlikely still, and could not be admitted except on the clearest evidence, which I think it is quite impossible to produce.

MELIACEÆ.

24. DYSOXYLON PATERSONIANUM, Benth. & Hook. f. (*Hartighsea Patersoniana*, Endl., Prod. Norf. 139).—Called “Shark” because of the unpleasant smell of the tree. Probably the tree thus referred to by Downing—“Among the many ornamental woods obtained from this ocean isle should be enumerated the rose-wood, believed to be a species of *Acacia*” (p. 204).

I sent a specimen of this plant to Prof. L. Radlkofer, of Munich, who favoured me with the following interesting note upon it :—

“ I obtained from Vienna the original plant of Endlicher, as I supposed what Endlicher called an ‘ arillus ’ might have been, as on your plant, only a thin external fleshy layer of the testa, and really so it was, and the specimen of Endlicher, which lies before me as I write, shows in every respect full identity with your specimen also in the number of *only 1 ovulum* in each cell of the germen and in the anatomical characters of the leaflets (as noted in my previous letter and sketch. (See Plate xxxviii.).

“ There remains only, as in your plant, some doubt about the (tubular ?) disk surrounding the germen; for also in the specimen of Endlicher it seems to be destroyed by the accrescence of the germen, as all the flowers have passed over in young fruits.

“ This is also the reason why Endlicher has taken the short relic of the style for the (fallen off) style (and stigma) itself.

“ What he says about the petals and staminal tube, he has taken from a somewhat incomplete (unpublished) drawing of Bauer, which I have seen too, but which gives no clearness about these things.

“ Endlicher had not seen ripe seeds, so his description may be completed by the following (taken from your plant) :—

“ Semina ovata, basi truncata callosaque, testa subdrupacea, strato tenui carnosio (ab Endl. ‘ arillus ’ dicto) in cellulis exterioribus materiam flavidam tannino quodammodo affinem in interioribus amyllum gerente obducta, dorso sulco levi (rimæ intercotyledonari respondente) notata; embryo rectus inversus; cotyledones semi-obovoidæ, plano-convexæ sat crassæ, basi versus angustatæ, lateraliter juxtapositæ, fusco-olivaceæ, amylo foetæ cellulisque secretoriis sparsis instructæ; radícula parva (supera), inter cotyledones omnino retracta; plumula pilosa glandulisque minutis clavatis breviter stipitatis adpersa (ad modum *Dysoxylis Lessertiani*, Benth., A. C. DC., Bull. Soc. Bot. France, xxii. 1875, p. 231, fig. 3 delineati.”)

OLACINEÆ.

25. PENNANTIA CORYMBOSA, Forst., Charact. Gen. 67 (described from New Zealand); Endl., Prod. Norf. 140. (Syn. *P. Endlicheri*, in Linnæa xvi. 341, t. 13, 1842.)

Index Kewensis has “ *Pennantia Endlicheri*, Reiss., in Linnæa xvi. 1842, 341, t. 13, synonymous with *P. corymbosa*, Endl., Prod. Norf. p. 80.

“ *P. corymbosa*, Forst., Char. Gen. 134, New Zealand.”

In Endlicher's Prod. Norf. the plant is called *Pennantia corymbosa*, Forst., Char. Gen. 67; but in Index Kewensis *P. corymbosa*, Forst., is stated to be from New Zealand, and *P. corymbosa*, Endl., from Norfolk Island.

I am of opinion that the Norfolk Island species is identical with the New Zealand one.

CELASTRINEÆ.

26. *ELÆODENDRON CURTIPENDULUM*, Endl., Prod. Norf. 141.— See my note on this species in these Proceedings, 1898, p. 125. Found also in Lord Howe Island. Called "Maple" on Norfolk Island.

SAPINDACEÆ.

27. *DODONÆA VISCOSA*, Linn.—A. Cunningham (*op. cit.*) has the note "*Dodonæa spathulata*, Sm., in Rees' Cyc. v. 5, p. 12, n. 2. *D. viscosa*, Forst., non Linn. Sides of Mount Pitt."

A manuscript in my possession (circa 1844) says, "Hopwood (*Dodonæa orientalis*) does not attain to more than a foot in diameter, and is principally used for veneering and turning ornaments."

It is called "Ti-tree" by some and by others "Ake-Ake" who remember the same species from New Zealand.

It is a singularly handsome small tree, reminding one of an Oleander, and bearing a profusion of crimson winged fruits. It is to be found on a bank of rocks in the vicinity of Bullock's Hut, north-west of the Island. Hemsley (Ann. Bot. x. 234) has the record for Lord Howe Island, "*Dodonæa lanceolata*, F.v.M. (*D. viscosa*, C. Moore, Rep. p. 3 vix Linn.)."

I have carefully examined our specimens, and those from Norfolk Island are all *D. viscosa*, and those from Lord Howe Island are all *D. lanceolata*.

A manuscript in my possession has the entry "Maple (*Acer Dobinea*) is also very handsome and used for cabinet work." Downing also has "The Maple (*Acer Dobinea* ?)." Probably *Dodonæa viscosa* is referred to. The "Maple" of the islanders (post-Pitcairn) is *Eleodendron curtispiculum*, Endl

LEGUMINOSÆ.

28. *MILLETIA AUSTRALIS*, Benth., in Miq., Pt. Jungh. 250. (Syn. *Milletia* (*Wistaria*) *Camerana*, F.v.M., Journ. Bot. xxiii. 353, 1885: *Milletiana Maideniana*, Bailey, Bot. Bull. v. 1892; Queensland Flora, 396: *Wistaria australis*, F.v.M., Journ. Bot. xxii. 290, 1884: *Pterocarpus australis*, Endl., Prod. Norf. 152).

I am of opinion that the above are specifically identical.

For some notes on *M. australis*, *M. megasperma* and *M. Camerana*, see Mueller in Journ. Bot. xxiii. 353.

The Norfolk Island plant rarely fruits. Mr. I. Robinson has only seen three fruits (one of which is in my possession) during his very long sojourn on the Island. They are identical with those of *M. Maideniana*.

Endlicher did not see the fruits, and he called it "frutex v. arbuscula"; it is really a rampant climber.

"The road was chiefly through thick forest, overrun with luxuriant climbers. Among them was a *Wistaria*, with pea-flowers, of purple and green, and leaves something like those of the Ash. It hangs in festoons of twenty or thirty feet, from the limbs of the trees that support it" (Backhouse, 258).

It is a very tough climber, hence the people call it "Samson's Sinew." It helped to form the almost impenetrable brush which rendered traffic through the Island so difficult in the early days. Accounts of the extraordinary denseness of the vegetation are traditional, and can be well understood.

29. *GLYCINE TABACINA*, Benth.—New for the Island.

30. *CANAVALIA OBTUSIFOLIA*, P. DC. (Syn. *C. Bauieriana*, Endl., Prod. Norf. 50).—This plant is probably referred to in the following passage:—"In the evening of yesterday the sawyer, his assistant, and ye carpenter was poisoned, by eating some beans which had a very tempting appearance much like ye broad Windsor bean; they have been so ill as not to do any work to-day." (Lieut. Govr. King, 8th May, 1788, in Hist. Rec. N.S.W. ii. 568). A purple-flowered runner on the coast, and reputed poisonous in Australia (see my 'Useful Native Plants of Australia,' p. 12).

Found by Cunningham on Phillip Island as well as on Norfolk Island.

31. *VIGNA RETUSA*, Walp., Repert. Bot. Syst. i. 778, 1842. (Syn. *V. lutea*, A. Gray, Bot. Amer. Expl. Exped. i. 454, 1854 : *V. lutea*, A. Gray in B.Fl. ii. 259, apparently through an oversight : *Callicythus volubilis*, Endl., Prod. Norf. 149).

32. *CÆSALPINIA BONDUCELLA*, Fleming. "*Guilandina Bonduc*, Linn., Lam. Ill. t. 336. -- In the woods between Long Ridge Farm and the south-west coast" (A. Cunn. in Heward, p. 123).

33. *STREBLORRHIZA SPECIOSA*, Endl., Prod. Norf. 151. Heward (from A. Cunningham's notes) states :— "*Streblorrhiza speciosa*, Endl., Prod. p. 97, is *Clianthus Baueri*, A. Cunn. MSS. *C. carneus*, Lindl., in Bot. Reg. Sept. 1841, t. 51)." Also the *Clitoria* sp. of A. Cunn., London Journ. Bot. i. 115, 1842.

Bentham (B. Fl. ii.) alludes to *Streblorrhiza* as "the very distinct genus." It was found on Phillip Island, but the species is now extinct. I believe there is only one original drawing in existence. It is by Bauer and is at the British Museum or Vienna. There is a coloured drawing in Edwards' Botanical Register (Lindley) 1841, under the name of *Clianthus carneus*, Lindl. From one of the "Miscellaneous Notices" in the same volume, No. 9 (not 7), Lindley's figure was prepared from a specimen cultivated by Mr. Pince of Exeter. It would be interesting to learn if the plant is wholly extinct, even from cultivation.

MYRTACEÆ.

34. *RHODOMYRTUS PSIDIoidES*, Benth.—New for the Island. If not planted it is apparently the only indigenous myrtaceous plant on the Island.

Metrosideros polymorpha, Gaudl., is in Tate's List, but I could only find a planted tree (in the Melanesian Mission Garden). It is what may be called a "probable species." Hooker (Handbk. Fl. N.Z. p. 73) has the note "abundant throughout all the Pacific Islands and New Caledonia." It occurs on Lord Howe Island.

LYTHRARIÆ.

35. LYTHRUM HYSSOPIFOLIUM, Linn.—It would appear that this plant has not been previously recorded from the Island.

PASSIFLOREÆ.

36. PASSIFLORA BAUERIANA, Mast., Trans. Linn. Soc. xxvii., 634, 1871. (Syn. *Disemma Baueriana*, Endl., Prod. Norf. 123 : *Murucuia Baueri*, Lindl., Coll.* t. 36).

This is the synonymy as given by Dr. Masters himself, who, following Endlicher, records it from Norfolk Island.

37. PASSIFLORA GLABRA, Wendl., Coll. Plant i. 55, t. 17, 1805. (Syn. *P. adiantifolia*, Ker, Bot. Reg. t. 233 : *Disemma adiantifolia*, DC. Prod. iii. 333).

This is the synonymy given by Masters (Trans. Linn. Soc. xxvii. 634). He records this species from Norfolk Island. Under the name of *Disemma adiantifolia*, DC., the species is recorded in Endl., Prod. Norf. 122, and Endlicher gives the additional synonyms *P. aurantia*, Andr., Bot. Reposit. t. 295, non Forst. nec Cav. : *P. adianthum*, Willd., Enum. 698. He also states that it is lacking in Bauer's herbarium (the one, of course, which formed the basis of Endlicher's work), that it grows in Norfolk Island, and that it has been growing in English gardens since the year 1792.

Backhouse (p. 268), says :—"Among the bushes there are two pretty species of Passion Flower, *Disemma adiantifolia* and *D. Baueriana*, with copper-coloured blossoms."

Endlicher places *P. adiantifolia* in the Section "Petioli glandulosi," and *P. Baueriana* in the Section "Petioli apice glandulosi."

The specimens collected by Mr. Robinson, and Mr. Boorman and myself are all referable to *P. glabra*, Wendl. The flowers are orange-coloured, the calyx eventually becoming crimson.

I could not find a second species, although I diligently searched for it. I would urge residents of the Island to favour me with

* Probably "Collectanea botanica," London, 1821, fol. A work which I have not been able to consult.

specimens of *D. Baueriana*, Mast., if they can now find it; and also a few ripe fruits of both species in order that I may raise some plants. The difference in the colours of the flowers and fruits of the two species should be noted.

There is plenty of the common Passion Vine (*Passiflora edulis*) growing wild.

CUCURBITACEÆ.

38. *BRYONOPSIS AFFINIS*, Cogn., in DC. Monogr. Phan. iii. 479. (Syn. *Bryonopsis Pancheri*, Naud., and *Bryonia affinis*, Endl., Prod. Norf. 125).

39. *SICYOS ANGULATA*, Forst., Prod. 1796. (Syn. *S. australis*, Endl., Prod. Norf. 124, 1833).—Called "Cucumber" on the Island.

40. *MELOTHRIA BAUERIANA*, F.v.M., Fragm. vi. 188, 1866. (Syn. *Zehneria Baueriana*, Endl., Prod. Norf. 126; *Zehneria Baueriana*, in Benth. & Hook., Gen. Plant. i. p. 830).—Called "Giant Cucumber" on the Island.

FICOIDEÆ.

Mesembryanthemum australe, Sol., Endl., Prod. Norf. 129.—I made diligent search for this species, but failed to find it. I have not the German edition of Hunter quoted by Endlicher.

41. *MESEMBRYANTHEMUM ÆQUILATERALE*, Haw. ("Pigs' Faces"), is not uncommon.

42. *TETRAGONIA EXPANSA*, Murray, in Comm. Gotting. vi. 13, 1783, not Solander as given in Endl., Prod. Norf. 130.—Called "Cook's Cabbage" on the Island.

Endlicher recognises two varieties, *cornuta* and *strongylocarpa*, on the Island. The specimens collected by me belong to the latter form; so do those in the herbarium from Lord Howe, New Zealand and Australia. The form *cornuta* (floribus sessilibus) appears to be rarer, but I have not seen it, and do not know whether Endlicher's varieties have been accepted by others.

UMBELLIFERÆ.

43. *APIUM PROSTRATUM*, Labill. (*S. australe*, Thouars).—Called “Wild Celery.”

44. *APIUM LEPTOPHYLLUM*, F.v.M.—New for the Island.

ARALIACEÆ.

45. *MERYTA LATIFOLIA*, Seem., Bonplandia, 1862, p. 265. (Syn. *Botryodendron latifolium*, Endl., Prod. Norf. 119. See also F.v.M., Fragm. ix. 169).—Called “Shade-tree” on the Island. It is now rare.

“Here also, as well as in most of the other shady woods throughout the island, *Botryodendron latifolium*, a shrub of singular form, allied to the Ivy, but of a very different appearance, prevails. Its figure may be compared to that of a long-leaved cabbage, mounted on a broom-stick. Its stem is about five feet high, and five inches round; its largest leaves are about two feet long, and one foot broad. The prisoners in the out-stations wrap their bread in these leaves, and bake it in the ashes. The fruit is a dense cluster of greenish purple berries, not edible, produced in the centre of the crown of leaves” (Backhouse, p. 270).

46. *MERYTA ANGUSTIFOLIA*, Seem., Bonplandia, 1862, 295. (Syn. *Botryodendron angustifolium*, Endl., Prod. Norf. 120. See also F.v.M., Fragm. ix. 169).

RUBIACEÆ.

47. *COPROSMA BAUERI*, Endl., Iconogr. t. 111.—This plant is very common in New Zealand. I did not find it in Norfolk Island; it is probably rare.

48. *COPROSMA LUCIDA*, Forst., Char. Gen. 138.

Coprosma lucida, Forst., Endl., Prod. p. 60. “I am by no means clear that this plant is not distinct from Forster’s plant which I gathered at New Zealand in 1826, in having broader emarginated leaves” (A. Cunn. MSS.).

Originally found by Bauer at Anson Bay.

49. *COPROSMA PILOSA*, Endl., Prod. Norf. 60.—This is sometimes called “Sharkwood” on the Island because “after rain the shrub smells like dead shark.”

COMPOSITÆ.

50. *VERNONIA CINEREA*, Less.—New for the Island.
51. *GRAPHALIMUM JAPONICUM*, Thunb. (*G. involucratum*, Forst., Endl., Prod. Norf. 100 : *G. lanatum*, Forst., Endl., Prod. Norf. 99).
52. *GNAPHALIMUM LUTEO-ALBUM*, Linn., Endl., Prod. Norf. 98.
53. *WEDELIA BIFLORA*, DC. (*W. Forsteriana*, Endl., Prod. Norf. 102 : *Bupthalmum uniflorum*, Forst., “Norfolciæ insula,” Forst., Prod. No. 541, p. 91).
54. *BIDENS PILOSA*, Linn.—“Broom-Stick” of the Islanders. New for the Island.
55. *COTULA AUSTRALIS*, Hook. f.—New for the Island.
56. *ERECHTITES ARGUTA*, DC. (*Senecio argutus*, Rich., Endl., Prod. Norf. 101).
57. *SENECIO LAUTUS*, Forst.—New for the Island.
58. *SONCHUS OLERACEUS*, Linn.—New for the Island (Captain Cook recorded “Sow thistle”).
59. *PICRIS HIERACIOIDES*, Linn.—New for the Island. I have expressed the opinion, and have given reasons, (Agric. Gazette, N.S.W., August, 1899) that this is indigenous to Australia, although Mueller held a different view.

CAMPANULACEÆ.

60. *WAHLENBERGIA GRACILIS*, A. DC.—New for the Island.
61. *LOBELIA ANCEPS*, Thunb., Prodr. Plant. Cap. 40, 1794. (Syn. *L. alata*, Labill., var. *stolonifera*, Endl., Prod. Norf. 97).

PRIMULACEÆ.

62. *SAMOLUS REPENS*, Pers., Syn. i. 171. (Syn. *S. littoralis*, R.Br., Endl., Prod. Norf. 94).

MYRSINEÆ.

63. *RAPANEA CRASSIFOLIA*, Mey., Pflanzenreich, 9 Heft, iv. 236, p. 366. (*Myrsine crassifolia*, R.Br., Prod. 534; Endl., Prod. Norf. 95).—Known as “Beech” on the Island.

SAPOTACEÆ.

64. *SIDEROXYLON COSTATUM*, F.v.M., (non Endl., as in Tate's List). (*Achras costata*, Endl., Prod. Norf. 96).—Found by Allan Cunningham on Phillip Island. It is also found on the mainland. Mr. Robinson calls it "Bastard Ironwood," and also a "Sharkwood."

JASMINEÆ.

65. *JASMINUM SIMPLICIFOLIUM*, Forst. f., Prodr. 3. (Syn. *J. gracile*, Andr., Endl., Prod. Norf. 111).

"Among these is the Slender Jasmine, *Jasminum gracile*, known in England as a delicate green-house plant. Here it grows over the bushes, or with twisted stems, as thick as a man's wrist, reaches the branches of lofty trees, at fifty feet from the ground, and climbs in their heads. In these cases it has probably grown up with the trees, the lower branches of which have progressively died away, and left the wreathed stems of the Jasmine-like ropes hanging from the upper boughs" (Backhouse, 258).

66. *OLEA APETALA*, Vahl, Syn. Bot. iii. 3. (Syn. *Olea Endlicheri*, F.v.M., Journ. Bot. xxiii. 354, 1885, a name which Mueller in the following passage proposed to adopt for the Norfolk Island *Olea*).

"As regards the *Olea* from Norfolk Island, it might be now incidentally remarked that it should be distinguished as *Olea Endlicheri*, inasmuch as Vahl described in the *Symbolae*, iii. 3, his *Olea apetalata* from New Zealand."

Tate has the name *Olea Endlicheri*, Britten, apparently a slip of the pen, through Mr. Britten being editor of the Journal of Botany. The species name cannot, of course, be changed simply because of a locality, otherwise one must change all the New Zealand species subsequently found in Norfolk Island. The Norfolk Island and New Zealand *Oleas* are quite identical. This was pointed out by Allan Cunningham (Lond. Journ. Bot. i. 116), and I also have proved their identity.

This is the "Ironwood" of the Island. The colour of the fruits varies a good deal, being golden-yellow, bright red and purple on the same and different trees.

A manuscript, circa 1843, says:—"Ironwood (*Notelea longifolia*) is used in all wheelwrights' work, and is very hard and durable; it is also used for

cabinet-work, and, when French-polished, it is not excelled by any of the fancy woods."

It is the timber chiefly used for posts on the Island, its durability in such a situation being far more than any others. It is used for shafts of vehicles, which is testimony to its strength and toughness.

Prof. Tate (*op. cit.* p. 217) also gives *Olea paniculata*, R.Br., from Norfolk Island. This species occurs in New Caledonia, but without particulars of its collection I do not recommend that it be admitted into the flora of Norfolk Island.

APOCYNÆÆ.

67. MELODINUS BAUERI, Endl., Prod. Norf. 113.—"Big Creeper."

68. ALYXIA GYNOPOGON, Roem. & Schult., Syst. Veg. iv. 440, 1819; F.v.M., Fragm. viii. 47. (Syn. *Alyxia daphnoides*, A. Cunn., Bot. Mag. t. 3313: also *A. Forsteri*, A. Cunn., Loud. Suppl. 580, teste Endlicher: *Gynopogon Alyxia*, Forst., Prod. p. 19, "foliis verticillatis quinis obovatis F. Norfolkicæ insula." A. Cunn. (Heward), quotes Bot. Mag. t. 3313, and gives the habitat "dry shaded woods."

A. Gynopogon is known on the Island as "Box."

In figuring *A. daphnoides* in Bot. Mag. t. 3313, A. Cunningham says:—

"From *A. Gynopogon*, however, which Forster first collected on that (Norfolk) Island, this second species differs in being altogether a shrub of a more robust and stiff habit, with rough tomentose branches and broader leaves, the latter of a uniformly thicker texture. . . . The stigma also is furnished at its summit with a little pencil-like tuft, whereas that of *A. Gynopogon* . . . is perfectly smooth."

I gave attention to the matter when on the Island, and agree with Mueller (Fragm. viii. 47) that they are not specifically different.

Ochrosia elliptica, Labill.—In early bud and therefore doubtful.

ASCLEPIADEÆ.

69. TYLOPHORA BIGLANDULOSA, A. Gray, Proc. Am. Acad. Sc., v. 1864; F.v.M. Fragm. ix. 169. (Syn. *Hybanthera biglandulosa*, Endl., Prod. Norf. 115).

T. enervia, F.v.M. The species hitherto only recorded from Lord Howe Island, but found by me in Norfolk Island also. There is great variation in the width of the leaves of this plant. I consulted Mr. Rudolph Schlechter, an authority on the *Asclepiadeæ*, who was recently in Sydney, and he is of opinion that the species is probably not different from *T. biglandulosa*. I could find only one species on the Island, and therefore recommend that *T. enervia* be not recognised as a separate species pending further enquiry.

GENTIANEÆ.

70. ERYTHRÆA AUSTRALIS, R. Br.—New for the Island.

BORAGINEÆ.

71. CYNOGLOSSUM AUSTRALE, R. Br., Prod. v. 1. p. 495.—Near the settlement (A. Cunn. in Heward).

CONVOLVULACEÆ.

72. IPOMŒA BONA-NOX, Linn. (Syn. *I. ambigua*, Endl., Prod. Norf. 108; and *I. carinata*, Endl., Prod. Norf. 107).

“*Ipomœa carinata*, a large plant of the Convolvulus tribe, having white flowers, with long tubes, that open at night, climbs among the trees, in the borders of the woods” (Backhouse, 268).

73. IPOMŒA CATARACTÆ, Endl., Prod. Norf. 106.—Its name was given because it was originally found at the Cascades.

“Among the sugar-cane and scrub at this point, a beautiful convolvulus-like plant, *Ipomœa cataractæ*, is entwined, and exhibits its large purple flowers shot with red” (Backhouse, 268).

74. IPOMŒA CONGESTA, R. Br., Prod. 485.—Flowers of a brilliant carmine.

75. IPOMŒA PES-CAPRÆ, Roth.—New for the Island.

76. *IPOMŒA PALMATA*, Forskael, Fl. Aegypt. Arab. 48. (Syn. *I. pendula*, R. Br., Endl., Prod. Norf. 105).

“One of the most beautiful climbers of the Island is *Ipomœa pendula*, which has handsome, fingered foliage, and flowers like those of the Major Convolvulus, but of a rosy pink, with a darker tube” (Backhouse, 258).

It is found all over the Island, climbing the highest trees.

77. *CONVOLVULUS AFFINIS*, Endl.,* (as *Calystegia*). (Syn. *Calystegia affinis*, Endl., Prod. Norf. 103.)—A small white runner.

78. *CONVOLVULUS SOLDANELLA*, Linn. (*Calystegia Soldanella*, A. Rich., Endl., Prod. Norf. 104).

79. *CONVOLVULUS MARGINATUS*, Spreng.—Recorded in B. Fl. iv. 430.

SOLANACEÆ.

80. *SOLANUM BAUERIANUM*, Endl., Prod. Norf. 109.—Bauer found it on Norfolk Island.

81. *SOLANUM NIGRUM*, Linn., Eng. Bot. t. 566.—Common everywhere (A. Cunn. in Heward). Found by him also on Phillip Island.

“Eaten by the prisoners, who also collect and cook the berries of the ‘Black Nightshade,’ *Solanum nigrum*. These berries are accounted virulently poisonous in England, but their character may possibly be changed by the warmer climate of Norfolk Island” (Backhouse, 264).

They are often eaten in New South Wales, both raw and cooked. At the same time instances of their injurious character in Europe are well authenticated. It may be that plants grown in damp and dismal situations are injurious, while those grown in dry, sunny places are innocuous, but this is but surmise, as I have not been able to trace the relation of soil, &c., to deleterious properties so far.

* I do not know whether this is breaking the golden rule of never making a man say what he did not say. Bentham’s practice when he transferred a species to another genus, was to give the author of the species in the old genus as the author of the same species in the new. But that practice has not been followed in the case of the next species, perhaps because Linnaeus and A. Richard described the species independently, and it was not merely a transfer of names.

82. *S. AVICULARE*, Forst., Prod. Ins. Aust. 107.—Recorded by A. Cunn., in Heward, as "*Solanum laciniatum*, Ait., Hort. Kew. v. 1, p. 247, Ed. 2, Bot. Mag. t. 319. Near the settlement."

SCROPHULARINEÆ.

83. *VERONICA CALYCINA*, R.Br.—New for the Island.

BIGNONIACEÆ.

84. *TECOMA AUSTRALIS*, R.Br. Syn. *Bignonia Pandora*, Gawl., the "Norfolk Island Trumpet-flower." See Bot. Mag. t. 865, where it is stated—

"It is a native of Norfolk Island, in the South Seas, whence the seeds were brought to this country by Governor Patterson, from whose information it appears that a very destructive blight generally makes its first appearance upon the young shoots of this shrub, and spreads from thence over the whole vegetation of the Island; from this relation the name we have adopted derived its origin."

Perhaps, however, the name is a reminiscence of H.M.S. Pandora, which captured some of the mutineers of the Bounty.

MYOPORINEÆ.

85. *MYOPORUM OBSCURUM*, Endl., Prod. Norf. 110.—"Sandalwood" of the islanders. Found also by Allan Cunningham on Phillip Island.

VERBENACEÆ.

86. *VERBENA OFFICINALIS*, Linn.—New for the Island.

87. *VITEX TRIFOLIATA*, Linn. (*Vitex ovata*, Thunb., Fl. Jap. p. 257).—"A shrubby procumbent plant on the rocks and sands of the coast, flowering in December" (A. Cunn. in Heward).

I did not collect it. It is a common Polynesian plant.

NYCTAGINEÆ.

88. *PISONIA BRUNONIANA*, Endl., Prod. Norf. 88.—Called "Wai Wai" after the Tahitian name (meaning "watery"); also "Beech."

AMARANTACEÆ.

89. *ACHYRANTHES ARBORESCENS*, R.Br., Endl., Prod. Norf. 89.—A scrambling tree of 20 or 30 feet, with a stem diameter of 1 foot. Called "Softwood" by the islanders, and its timber is indeed about as hard as a tough turnip.

90. *ACHYRANTHES ASPERA*, Linn., Spec. Plant. 204, 1735; F.v.M., Fragm. ix. 169; B.Fl. v. 246. (Syn. *A. canescens*, R.Br., Endl., Prod. Norf. 90: *A. aspera*, Linn. var. *canescens*.)—Same as the Lord Howe Island plant.

POLYGONACEÆ.

91. *RUMEX BROWNII*, Campd.—New for the Island.

92. *MUEHLENBECKIA AUSTRALIS*, Meissn., Gen. Comm. 227. (Syn. *Polygonum australe*, A. Rich., Endl., Prod. Norf. 86: *Coccoloba australis*.)—Called "Shrubby Creeper" by some people on the Island. Recorded by Allan Cunningham from Phillip Island also.

PIPERACEÆ.

93. *PIPER EXCELSUM*, Forst., Prod. No. 20.—"Ins. Norfolk, Cunningham! in h. Kew." C. De Candolle in DC. Prod. xvi. (1), p. 335: "*P. psittacorum*, foliis majoribus 0·12 longis. In ins. Norfolk (Cunningham! Hügel! Endlicher! in h. Vindob.): *Macropiper psittacorum*, Endlich.! prod. Norfolk, p. 37, Bauer pl. Norf. t. 37, fide Endlich. l.c. (C. De Candolle, *loc. cit.*)."

It would thus appear that the typical form, as well as a variety, occurs on Norfolk Island. The variety has been recorded by Allan Cunningham from Phillip Island.

"The Norfolk Island Pepper, *Piper psittacorum*, which produces a yellow, pulpy, pendent, cylindrical fruit, of a spicy, sweetish taste, is everywhere plentiful in the woods. It rises with a few, jointed, cane-like, green stems, to from four to ten feet high, bearing large, heart-shaped leaves" (Backhouse, p. 271).

A manuscript states:—

"The Norfolk Island Spice (*Piper psittacorum*) attains the height of 10 feet, and has heart-shaped leaves; it produces a cylindrical fruit of a spicy, sweetish taste, which is an excellent preserve, and if gathered green it is

equally good pickled. The leaf bears great resemblance to that of the Pan or beetle-creeper of the East Indies."

94. *PEPEROMIA REFLEXA*, A. Dietr., Spec. Pl. i. 180, var. *œmula*, C. DC.—"Foliis ut in precedente (var. *capensis*) pedunculo hirtello folia æquante. In ins. Norfolk (Bauer! in S. Endl. et in h. Berol. Cunningham! in h. Kew.). *Piper œmulum*, Endl., prod. flor. Norf. p. 36. Bauer ill. Norf. ined. p. 127, fide Endl. l.c. *Peperomia reflexa*, forma *Norfolcensis*, Miq. Syst. ! p. 172" (C. De Candolle in DC., Prod. xvi. (1), 451).

95. *PEPEROMIA URVILLIANA*, A. Rich. (*loc. cit. infra*). Syn. *Peperomia Endlicheri*, Miq., Syst. Pip.* 102.—"In insulis Norfolk (Cunningh. ! in h. Kew et Endlich. ! in h. Berol. MacGillivray n. 971 ! in h. Kew).

Syn. *Piper simplex*, Endl., ! Prod. Norf. p. 37. Bauer ill. Norf. t. 12a (teste Endl. l.c.). *Peperomia Urvilliana*, A. Rich. in d'Urv. Voy. Astrolab. p. 356 (C. De Candolle in DC. Prod. xvi. (1), 413). C. DC. gives *P. Endlicheri*, Miq., as the name. *P. Urvilleana*, A. Rich. (1832), is the name adopted by Mueller in Census, and has undoubted priority. The "e" is, however, incorrect.

96. *PEPEROMIA BAUERIANA*, Miq., Syst. 120.—"In ins. Norfolk (Bauer ! in h. Endl., Endl. ! in h. Berol. Cunningham in h. Kew). *Piper adscendens*, Endl. ! prodr. Norf. p. 36" (C. DC. in DC. Prod. xvi. (1), 414).

97. *PEPEROMIA LEPTOSTACHYA*, Hook. et Arn., in Beech. Bot. p. 96. Recorded by Tate (*op. cit.* p. 217), but I do not know the name of the collector.

THYMELEACEÆ.

98. *WICKSTREMIA AUSTRALIS*, Endl., Prod. Norf. 93.—Known as "Kurrajong." Its bark is the common tying material of the Island. It attains a height of 20 feet. Perhaps it is referred to in the following passage :—

"I was told this day that one of the convicts had found out the bark of a tree fit for making lines or rope. On examining it I found it, as far as I can

* Miquel (F. A. W.), Systema Piperacearum. Roterodami, 1843-4, 8° : also Illustrationes Piperacearum (Vratislaviæ, 1844) 4°.

at present judge, very proper for the purpose of making lines, ropes or cloths. It in many respects answers the description given of the Chinese mulberry paper by Captain Cook of which the inhabitants of Otaheite make their cloths. On trial we found this bark would answer every temporary purpose of tying, but as it very soon rots when exposed to the weather it will not answer to be worked" (Lieut.-Govr. King—31/3/1789—in Hist. Rec. N.S.W. Vol. ii., p. 617).

LORANTHACEÆ.

99. VISCUM ARTICULATUM, Burm. f., Fl. Ind. 311. (*Viscum distichum*, Endl., Prod. Norf. 119).

The joints are as much as $1\frac{1}{2}$ in. across. It is very abundant on the Island, being very common on *Baloghia lucida*, the Bloodwood. The only other native tree on which I observed it is *Xanthoxylon Blackburnia*, but further search should be made. As regards introduced plants, it is common on Lemons and kills Peach trees. In fact it is a pest in orchards.

SANTALACEÆ.

100. EXOCARPUS PHYLLANTHOIDES, Endl., Prod. Norf. 91.

A manuscript in my possession states :—"The Cherry-tree, the bark of which is used in tanning, is one of the most useful woods and is decreasing rapidly by being stripped of its bark and so left to perish."

Downing states, "The Cherry-tree, a species of *Exocarpus*; the bark of the latter rich in tannin, has been used for leather-making."

The islanders now call it "Isaac Wood," after Isaac Quintal, from Pitcairn, who first pointed it out.

We therefore have an instance of two sets of vernaculars, the Pre-Pitcairn and the Pitcairn.

The largest tree I saw was 30 feet high and with a diameter of 1 foot, in the north-west part of the Island, near Mr. Kendall's.

EUPHORBIACEÆ.

101. EUPHORBIA OBLIQUA, Endl., Prod. Norf. 144.

"The rocky shore of this Island is accessible from the land, in some places, on the south-west. In a few of the valleys, near the sea, in this direction,

Euphorbia obliqua, a remarkable shrub, forms copses, attaining, when shaded by trees, to 15 feet in height, and 2 feet in circumference" (Backhouse, 270).

I did not come across it. It has probably been much destroyed.

102. *E. GLAUCA*, Forst., Prod. 208; Endl., Prod. Norf. 145. See also Hook., Hdbk. Fl.N.Z. p. 248.

A neat shrub found by Mr. Boorman and myself on the beach at Ball's Bay. The leaves somewhat resemble those of an Oleander.

103. *EUPHORBIA NORFOLKIANA*, Boissier in DC., Prod. xv. 110.

"In insula Norfolk (Backhouse! A. Cunn. in h. Kew. F. Bauer in h. Vindob.). *Euphorbia tannensis*, Spreng., Syst. iii. 791.

An erect plant synonymous with *Croton elutioides*, Forst., is stated by Boissier to occur on Norfolk Island. There is in Forst. Prod. 521 a "Euphorbia Norfolkicæ insula."

Prof. Tate (*op. cit.* p. 217) says that *E. Norfolkiana* and *E. tannensis* are identical. I do not know on what authority. I did not collect the plant.

104. *E. SPARMANNI*, Boissier.—First recorded from the Island by Tate. I collected it also.

105. *BALOGHIA LUCIDA*, Endl., Prod. Norf. 143.

A manuscript says:—

"The Bloodwood (*Croton sanguisflua*) is of little value except for firewood, but on an incision being made in the bark, a fluid exudes which is used for staining furniture, marking the convicts' slops, etc., and it is a good tonic and astringent.

Allan Cunningham recorded this tree also from Phillip Island. It is the commonest tree for *Viscum*. The sap has been used as medicine as an astringent.

106. *EXÆCARIA AGALLOCHA*, Linn., Endl., Prod. Norf. 142.

I heard this small tree called "Sapota" by a resident.

I do not doubt that this is the plant referred to by Hunter (p. 311) in the following passage:—

" . . . the workmen indeed had been often blinded for four or five days together by the white sap of a tree, which getting into their eyes, caused a most excruciating pain for several days. . . . One man was totally blinded with it for want of making timely application to the surgeon."

URTICACEÆ.

107. MALAISIA TORTUOSA, Blanco.—Found in Lord Howe Island. Tate records it from Norfolk Island.

108. CELTIS PANICULATA, Planch. (Syn. *Solenostigma paniculatum*, Endl., Prod. Norf. 42).—The “Whitewood” of the Island.

109. PSEUDOMORUS BRUNONIANA, Bureau, var. PENDULINA. (Syn. *Morus pendulina*, F. Bauer, in Endl., Prod. Norf. 40).—The “Isaac Wood” of some people. See *Exocarpus* (*supra*, p. 715). But its most general name is “Siah’s backbone” (Josiah’s backbone, after Josiah Adams), in allusion to the pliability and toughness of its wood.

110. PROCRIS MONTANA, Steud. (Syn. *Elatostemma montanum*, Endl., Prod. Norf. 39).

111. BOEHMERIA AUSTRALIS, Endl., Prod. Norf. 38.

112. PARIETARIA DEBILIS, Forst. f., Prod. 73. (Syn. *Urtica debilis*, Endl., Prod. Norf. 37).

b. Monocotyleæ.

ORCHIDEÆ.

113. OBERONIA TITANIA, Lindl., Fol. Orch. Ober. 8 (Syn. *Titania miniata*, Endl., Prod. Norf. 31).—From Anson Bay.

114. OBERONIA PALMICOLA, F.v.M.—On the bark of trees. New for the Island.

115. DENDROBIUM BRACHYPUS, Reichb. f., Linnæa xli., 42, 1877. (Syn. *Thelychiton brachypus*, Endl., Prod. Norf. 32).—Rare.

116. DENDROBIUM MACROPUS, Benth. & Hook., Gen. Pl. iii. 500. (Syn. *Thelychiton macropus*, Endl., Prod. Norf. 32).—Common on Pines (*Araucaria*) and other trees.

117. BULBOPHYLLUM ARGYROPUS, Reichb. f., Linnæa, xli., 42, 1877. (Syn. *Thelychiton argyropus*, Endl., Prod. Norf. 32).—Originally recorded from Anson Bay.

Bulbophyllum (sp. aff. to *B. exiguum*, F.v.M.).

118. PHREATIA LIMENOPHYLAX, Reichb. f., Bonplandia, 1857, 54 (partly); B.Fl. vi. 290. (Syn. *Plexaure limenophylax*, Endl.,

Prod. Norf. 70).—On the bark of trees. A small plant originally recorded from Anson Bay.

119. *MICROTIS PORRIFOLIA*, R.Br.—The only terrestrial orchid. Apparently new for the Island. Common at Bullock's hut.

AMARYLLIDÆ.

120. *CRINUM NORFOLKIANUM*, A. Cunn.

“A. Cunn. MSS. (*sp. nov.*) foliis margine lævibus, pedicellis ovario parum longioribus, staminibus laciniis lanceolatis dimidio brevioribus, filamentis anthera 5-6-ies longioribus. In wet ground, Mill or Arthur's Vale. This species is near *C. podunculatum*, R.Br., but certainly distinct” (A. Cunn. in Heward).

It is in this locality to this day.

LILIACEÆ.

Smilax purpurata, G. Forst., Prod. 373.—“Sarsaparilla.” I believe I have this on good authority, but I cannot quote it.

Smilax glycyphylla, Sm.—In Tate's List. I doubt it.

121. *RHIPOGONUM DUBIUM*, Endl., Prod. Norf. 69.

122. *GEITONOPLESIMUM CYMOSUM*, A. Cunn., Endl., Prod. Norf. 68.

There has been considerable confusion with the synonymy of the *Cordyline*s, as will appear from the following:—

123. *CORDYLINE OBTECTA*, J. G. Baker, Journ. Linn. Soc. Bot. xiv., 543. (Syn. *Cordyline Baueri*, Hook. f., Gard. Chron. 1860, 792; Mueller, Second Census, 197).

Cordyline australis, Endl., Prod. Norf. 29 (Bauer, Ill. 176-7, 207 and Regel, Gartenfl. t. 450, according to J. G. Baker).

The name *Cordyline nutans*, A. Cunn., under which it commonly occurs in Australian gardens, should apparently be *Cordyline nutans*, Hort.

Dracena obsecta, Graham, Edin. Phil. Journ. 1827, 175; *Dracena australis*, Hook., Bot. Mag. t. 2835, non Forster; *Dracena nutans*, A. Cunn. MSS.

Not only has there been much confusion in regard to the synonymy of this species, but also in regard to its native country.

Mr. J. G. Baker, who first cleared up the matter,* correctly gives the locality "Insula Norfolk (sed non Nova Zelandia nec Nova Hollandia ut auctores dicunt)."

The Islanders call it "Rau-ti" or Palm, this being the usual name for a *Dracæna*.

". . . . a Norfolk Island Bread-fruit, *Cordyline australis*, 2 feet 9 inches. The last sometimes attains 20 feet in height (I have seen it higher.—J.H.M.); it branches from within a few feet of the ground, and forms several heads, with flag-like leaves, and long, branched spikes of greenish, star flowers, succeeded by whitish, or bluish-purple berries, that are eaten by parrots. It often forms a striking object, where a woody valley runs out into grass, growing at the extreme margin of the wood" (Backhouse, 271).

In a manuscript in my possession, and also in Downing (*op. cit.*), it is referred to as *Charlwoodia*† *australis*.

124. CORDYLINE TERMINALIS, Kunth, var. *cannæfolia*, J. G. Baker, *op. cit.*, p. 541: *C. cannæfolia*, R.Br.

"*Cordyline cannæfolia*, R.Br., Prod. v. 1., p. 280. On the dry grassy sides of the hills immediately above the military officers' gardens" (A. Cunn. in Heward).

On Norfolk Island it is known as the "Pitcairn or Home Rau-ti" ("home" being the word for Pitcairn amongst the Pitcairn Islanders and their descendants).

According to Allan Cunningham it was apparently not scarce on the Island in 1830. Although I made careful search, I found only one plant of it (it certainly is rare), and that was in a garden at Steel's Point. I was distinctly told that the Pitcairners brought this plant to Norfolk Island, and my informant reminded me that the sweet root was formerly used in Pitcairn to prepare an ardent spirit. In the face of Cunningham's statement I, of course, admit it as a Norfolk Island indigene, but it would appear to have been exterminated, perhaps because the convicts turned it into a curse, as the Pitcairners did at an early

* "Revision of the Genera and Species of Asparagaceæ." Journ. Linn. Soc. Bot. xiv. 543.

† Sweet's *Charlwoodia*; see his Flora Australasica, t. 18. His *Charlwoodia congesta*, figured there, is our *Cordyline stricta*, Endl.

period of their history. The Pitcairners brought this plant to Norfolk Island in a box, as indeed they did many others, and I believe my informant is quite correct in this respect, as his wife is a native of Pitcairn, and the circumstances are quite clear to him.

125. PHORMIUM TENAX, Forst., Endl., Prod. Norf. 65.

This, next to the *Araucaria excelsa*, useful for spars, is the plant considered by Governor Phillip and the Home authorities to be the most important economic plant on Norfolk Island, as the provision of cordage for H.M. Navy was a most important matter.

Following are Lieut.-Govr. King's instructions in regard to this plant:—

“You are immediately to proceed to the cultivation of the flax-plant, which you will find growing spontaneously on the Island.” (Hist. Rec. N.S.W. Vol. i. pt. 2, 130).

King replied (*ib.* 126) that the cultivation would be attended to when people could be sent to clear the ground.

“We found our road must be down ye hill, which is perpendicular and quite full of a large kind of iris, which was a providential circumstance for us, as they served us to hold by when we were all falling, and had they not presented themselves, we must have fell down a depth of 90 feet.” (Lieut.-Govr. King, in March, 1788, in Hist. Rec. N.S.W. Vol. ii. p. 552.)

Its natural habitat on the Island is the sides of steep banks or cliffs. Under date 17th of the same month (they had only just arrived on the Island), he states, (*ib.* p. 557):—

“This day I discovered that ye flax-plant, which Capt. Cook takes notice of, is no other than that plant which I have hitherto called ye larger kind of iris, with which ye Isle abounds, but it in no manner resembles ye flax of Europe, its appearance being more like flags. A bundle of it was tied up and put into a pool of water to soak intending to try it after ye European method of preparing ye flax.”

Following was the first attempt to manufacture it:—

“On the 29th I found that 30 bundles of flax, put into soak in October, was sufficiently rotted to pass it thro' the hackle; broke off 4 men to clean it. . . . I mean to let it stay 3 days longer in the water, and to make

the women wash it in running water, and afterwards dry it, and then pass it thro' the hackles" (*Ib.*, p. 261).

The Lieut.-Govr. introduced two New Zealanders to teach the prisoners how to extract the fibre from the flax, but their process was found to be so tedious that it was abandoned.

126. *DIANELLA INTERMEDIA*, Endl., Prod. Norf. 66.—Recorded from Anson Bay.

COMMELYNACEÆ.

127. *COMMELYNA CYANEA*, R.Br. Prod. v. 1, 269.—Recorded by A. Cunningham from "near the settlement." Known as "Forget-me-not" by the Islanders. Found also by him on Phillip Island.

PALMÆ.

128. *RHOPHALOSTYLIS BAUERI*, H. Wendl. and Drude, Bot. Zeit. xxxv. (1877) 63. (Syn. *Kentia Baueri*, Seem., Fl. Vit. 269: *Areca sapida*, Endl., Prod. Norf. 64, non Solander ex Forst.).

Hooker (Hbk. N.Z. Fl., 288) points out that *sapida* and *Baueri* are closely allied, but that the latter is a larger plant. While this plant is supposed to be peculiar to Norfolk Island and Chatham Island (N.Z.), Mr. I. Robinson informs me that it also occurs on Sunday Island, in the same latitude, a statement that might be borne in mind by any botanist or collector visiting the latter Island.

The Norfolk Islanders call this palm "Nikau," which is the New Zealand name for *R. sapida*, and which has probably been borrowed from New Zealand.

The midribs are used for brooms, and there is some illicit felling of the palms for this purpose, which should be prohibited. The following interesting account of the palm is by Backhouse; and here I may mention that Backhouse's descriptions of the flora, usually entirely accurate, are particularly valuable inasmuch as the vegetation has been so much interfered with since his day:—

"In the woody gullies the Norfolk Island Cabbage-tree, *Areca sapida*, abounds. It is a handsome palm, with a trunk about twenty feet in height, and from one and a half to two feet in circumference, green and smooth,

with annular scars, left by the fallen leaves. The leaves or fronds form a princely crest at the top of this elegant column; they are pectinate, or formed like a feather, and are sometimes nineteen feet in length; they vary from nine to fifteen in number. The apex of the trunk is enclosed in the sheathing bases of the leaf-stalks, along with the flower buds, and young leaves. When the leaves fall they discover double compressed sheaths, pointed at the upper extremity, which split open indiscriminately, on the upper or under side, and fall off, leaving a branched spadix, or flower-stem, which is the colour of ivory, and attached by a broad base to the trunk. The flowers are produced upon this spadix; they are very small, and are succeeded by round seeds, red externally, but white, and as hard as horn, internally. As the seeds advance towards maturity, the spadix becomes green. The young, unfolded leaves of the Cabbage-tree, rise perpendicularly, in the centre of the crest. In this state they are used for making brooms; those still unprotruded and remaining enclosed within the sheaths of the older leaves, form a white mass, as thick as a man's arm; they are eaten raw, boiled, or pickled. In a raw state, they taste like a nut, and boiled they resemble artichoke bottoms. The seeds furnish food for the Wood-quest, a large species of pigeon" (Backhouse, 264).

PANDANEÆ.

Pandanus Moorei, F.v.M., in Tate's List.—There is no *Pandanus* on the Island, and the mistake has probably arisen through assuming that the name "Screw Pine," freely used, refers to a *Pandanus*. *P. Moorei*, F.v.M., recorded originally from Lord Howe Island, has no separate existence. I have dealt with the matter at some length—these Proceedings, 1898, p. 141.

129. FREYCINETIA BAUERIANA, Endl., Prod. Norf. 63.—"Screw Pine" of the islanders; called also "Palm" and "Palm Lily." Following is Backhouse's account of this plant. The base of the fructification is eaten and is described to me as tasting like a banana.

"One of the remarkable vegetable productions of this island is *Freycinetia Baueriana*, or the N. I. Grass Tree. . . . Its stem is marked by rings, where the old leaves have fallen off, and is an inch and a half in diameter; it lies on the ground, or climbs like ivy, or winds round the trunks of trees. The branches are crowned with crests of broad, sedge-like leaves. From the centre of these arise clusters of three or four oblong, red, pulpy fruit, four inches in length, and as much in circumference. When the plant is in flower the centre leaves are scarlet, giving a splendid appearance to the plant, which sometimes is seen twining round the trunk of the princely Tree-fern" (Backhouse, 256).

TYPHACEÆ.

130. *TYPHA ANGUSTIFOLIA*, Linn., var. *BROWNII*, Kronfeld, Verh. Zool.-Bot. Ges. Wien, xxxix. 152 (1889). (Syn. *T. latifolia*, Forst., Prod. 64; *T. angustifolia*, R.Br., P. Graebner, Typhaceæ (Das Pflanzenreich, p. 13.)—"Swampy ground, Arthur's Vale" (A. Cunn.). It still occurs in the same place.

AROIDEÆ.

I was informed that there is an edible and a non-edible ("bastard") Taro on the Island. I presume the latter refers to *Colocasia macrorrhiza*, which is a likely inhabitant, though I did not notice it.

131. *COLOCASIA ANTIQUORUM*, Schott.—"Taro." I do not doubt that the following extracts refer to this species. I saw it abundantly present at the place indicated by Lieut.-Govr. King in 1788. I quote the passage, as it is very important to arrive at precision in regard to the indigenous vegetation, especially where, as in the case of Norfolk Island, such vegetation has been so much interfered with:—

"On ye 27th I discovered a great quantity of plantane trees,* which grow close to the stream of fresh water which runs through the valley, which is in this part of it dry, and not swampy as it is opposite the hill on which the settlement is and below it. The valley is also very wide and bordered by some small hills, which are as thickly covered with wood as any other part of ye island. . . . The plantane trees grow close to the water, and are so thick that they choak each other, besides the very great quantity of other small aquatic shrubs, and the bear-bind with which they are interlaced must necessarily retard their perfection. I, therefore, as soon as a man can be spared, intend clearing a spot round them, and transplanting some of ye suckers into dryer ground" (Lieut.-Govr. King, 27th April, 1788, Hist. Rec. of N.S.W., Vol. ii., p. 566).

And again, under date 16th May, 1788:—

"Broke two men off from clearing away on the N.E. side of ye hill to assist Mr. Altree in removing his things to the plantane plantation, where I

* Plantain does not here refer to a *Musa*. The use of the word "tree" amongst old writers in the sense of "plant" is common enough. We still use the term "rose-tree" frequently. Vide *Musa*, infra, p. 754.

have ordered him to reside, in order to take care of those trees, and cultivate the adjoining grounds which may be cleared away in a short time" (*Op. cit.*, p. 570).

And on 3rd June :—

"Twelve plantane suckers were transplanted from ye rivulet into the plantation. I also sent there the banana trees as well as the lime* trees which I brought with me, not doubting but they will thrive" (*Op. cit.*, p. 575).

See also Hunter (pp. 306 and 308), founded on King's notes :—
". . . there is a fine valley in which a number of plantain or banana trees were found on the 5th" (April, 1788); and Order No. viii. (for the Good Government of the Island, promulgated at the same time) :—"No person is to cut down or destroy any banana tree." The colony was then but a few weeks old, and I think that King was mistaken in referring the plants to the Plantain or Banana (*Musa*).

CYPERACEÆ.

132. *CYPERUS HÆMATODES*, Endl., Prod. Norf. 59.—Used for basket-making. Some of the women make very neat baskets from the leaves.

Cyperus lucidus, R.Br.—I have a note of this name, but no specimens. The matter should be further enquired into.

133. *C. ROTUNDUS*, Linn.—New for the Island. Perhaps an introduction.

134. *C. CONGESTUS*, Vahl.—New for the Island.

135. *KYLLINGIA MONOCEPHALA*, Rottb.—New for the Island.

136. *HELEOCHARIS ACUTA*, R.Br.—Very variable in size and robustness. New for the Island.

137. *SCIRPUS NODOSUS*, Rottb. (*Ficinia guttata*, Endl., Prod. Norf. 61).—Six to 8 feet high.

138. *SCIRPUS INUNDATUS*, Spreng. (*Isolepsis conspersa*, Nees, Endl., Prod. Norf. 60).

139. *SCIRPUS LACUSTRIS*, Linn.—New for the Island.

* *Citrus*, not *Tilia*.

140. *S. RIPARIUS*, Spreng.—New for the Island.

141. *SCIRPUS MARITIMUS*, Linn.—I obtained this at the Water Mill Dam and other places. Dr. Metcalfe informs me that it was originally collected by his son, and that the late Prof. Kirk of Wellington, N.Z., named it, but I cannot find any record of publication.

142. *CAREX NEESIANA*, Endl., Prod. Norf. 62.

143. *CAREX INVERSA*, R.Br.—New for the Island.

GRAMINEÆ.

“There are, likewise, great plenty of cabbage trees, but not a single blade of grass has been seen on the island, the pigeons, sheep, and goats eating the leaves of the shrubs and of particular trees, with which they grow very fat.” (Governor Phillip [Sept., 1788], doubtless based on Lieut. Govr. King’s Report, Hist. Rec. N.S.W., Vol. i., Pt. 2, p. 187.)

It is not easy to understand the statement as to “not a single blade of grass.” The trees and shrubs were very much more abundant than at present, but the Island had at that time been imperfectly explored, and is to be taken simply as a general statement. Perhaps there had been a partial drought. Following appear to be the indigenous species:—

144. *PANICUM NORFOLKIANUM*, Nees, Endl., Prod. Norf. 52.

145. *P. EFFUSUM*, R.Br.

146. *P. CRUS-GALLI*, Linn., Endl., Prod. Norf. 51.

147. *P. SANGUINALE*, Linn., var. *CILIATUM* (*P. ciliare*, Retz.).

148. *PASPALUM SCROBICULATUM*, Linn.

149. *OPLISMENUS COMPOSITUS*, Beauv., Endl., Prod. Norf. 54.—
Forming dense mats in the forests.

150. *O. UNDULATIFOLIUS*, Beauv. (Syn. *O. emulus*, Kunth, Endl., Prod. Norf. 53, and *O. setarius*, R. et Sch.)

151. *ANDROPOGON REFRACTUS*, R.Br.

152. *A. AFFINIS*, R.Br.—A very faint pit on the outer glume.

153. *MICROLÆNA STIPOIDES*, R.Br.

154. *ECHINOPOGON OVATUS*, Beauv.

155. *SPOROBOLUS INDICUS*, R.Br.—Recorded by Tate.

156. *DEYEUXIA FORSTERI*, Kunth. (*Agrostis Forsteri*, Roem. et Schult. : *A. Solandri*, F.v.M., a name against which Bentham, B.Fl. vii. 579, protests).

157. *DICHELACHNE SCIUREA*, Hook. f. (*D. montana*, Endl., Prod. Norf. 56).

158. *DICHELACHNE CRINITA*, Hook. f.

See B.Fl. vii. 575, where it would appear that there is some doubt as to the identification of *D. montana* with *sciurea*. If they are identical, then Endlicher's, or an earlier name of Kunth's, must stand.

159. *CYNODON DACTYLON*, Linn.—Everywhere.

160. *AGROPYRON SCABRUM*, Beauv. (*Triticum scabrum*, R.Br., Endl., Prod. Norf. 57).

161. *TRITICUM KINGIANUM*, Endl., Prod. Norf. 58.—Found in Phillip Island.

Of the above, Nos. 145, 147, 148, 151, 152, 153, 154, 156, 158, and 159 appear to be new records for the Island.

ii. G Y M N O S P E R M Æ.

CONIFERÆ.

1. *ARAUCARIA EXCELSA*, R.Br., Endl., Prod. Norf. 76 (*Cupressus columnaris*, Forst.*).

For list of synonyms, see Endlicher; also Hooker in London Journ. Bot. ii. 500 (1843), which contains a useful account of the tree.

This tree was originally observed by Cook (*op. cit.*) when he discovered the island; in fact no one, even now, can fail to see it, either from sea or land.

* *Cupressus columnaris*, Forst., Prod. 351 :—"Foliis imbricatis subulatis sulcatis, strobilis cylindricis elongatis, F. Nova Caledonia et Norfolkica insula."

As regards its size, the reports of the early residents are important, particularly as they were mostly taken from actual measurements of felled trees.

Lieut.-Govr. King wrote in March, 1788 :—

“The pines, which are very numerous, are of an incredible growth, one of them which had been blown down or fell by age measured 140 feet, and several others which we measured were 27 feet in circumference; they grow quite straight, and not an exuberance of any kind whatever on them from ye top to the bottom” (Hist. Rec. N.S.W., Vol. ii., p. 551).

Under date 17th March he wrote :—

“Felled a pine near it to saw into planks and scantling; its length is 115 feet and 2 ft. 3 in. diameter about breast high.” . . . “I believe the wood is nearly as light as the best Norway masts, and grows to a most extraordinary size, some of the trees measuring from one hundred and sixty to one hundred and eighty feet without a branch” (*Ib.*, p. 551).

“The remains of two Pines, which were noted for their magnitude, and were blown down in a storm, were lying by the side of the road. These were called ‘The Sisters’; they were nearly 200 feet in height” (Backhouse, 258).

“On the northern ascent of Mt. Pitt a pine was measured 29½ feet in circumference at 4 feet up” (Backhouse, 271).

“We measured a Norfolk Island pine, twenty-three feet, and another twenty-seven feet, in circumference. Some of them are nearly two hundred feet high” (*Ib.* p. 264).

Dr. Metcalfe informs me that the largest tree he has measured or heard of had a girth of 37 feet.

The following notes from Backhouse’s botanical MSS. are quoted by Hooker :—

“This stately tree is similar in figure to the Norway Spruce; but its branches are in more distant whorls, and usually about five in a whorl. The young lateral branchlets are deciduous, or, at least, they fall off in great numbers. The two lips of the scales of the cone become united and form a ligneous covering to the seeds; external to this is a fleshy, terebinthaceous coat, containing a milky resinous juice; the cone resembles a globular pine apple in form, and has the scales deciduous. Large quantities of resin, like frankincense, are exuded from incisions in the bark. The timber is useful for inside work, but soon perishes when exposed to the weather, especially

as posts in the ground. The knots* formed by the larger limbs of old trees which lose in some measure their regularity of form, are close-grained, and afford handsome material for turning and inlaying" (London Journ. of Bot., ii. 500-501 (1843).

Backhouse went on to say that the grubs of the pine afforded food on Norfolk, Phillip and Nepean Islands to the now extinct parrot with long mandibles (*Nestor*).

A manuscript in my possession says:—

"The Norfolk Island Pine (*Atlingia excelsa*) is seen 100 feet above the other forest trees, and resembles the Norway Spruce, but its tiers are more distant. Fences made of this timber seldom stand 3 years. It is generally used for building purposes, flooring, partitions, etc.; and when kept dry and not exposed to the weather, it is more durable. The Pine (*Araucaria excelsa*) is also used for the same purposes, and is of precisely the same quality, but not so lofty as the former."

This alleges that there are two kinds of Pines on the Island. That there are two kinds is believed by a number of people in Australia also, but I could obtain no evidence of a second Pine—not even a slight variety of the normal species.

This *Araucaria* bears seeds usually every third year, and there is considerable commerce in them. Although Pines have been recklessly cut down for settlement, and for other reasons, they are abundant still; yet the Islanders have found it necessary to prohibit the felling of them on unalienated land except under close restrictions. The Pine is still planted a little on the Island, but the most notable instance is that of the noble avenue from Longridge to the Melanesian Mission and Orange Vale planted about 80 years ago. It is $1\frac{1}{4}$ miles long. Although I saw pines perhaps taller than those of the same species in the Botanic Gardens, Sydney, yet I saw none so large and symmetrical as the latter.

This timber is the one alone used for shingles on the Island. Heart shingles last 20 years, and ordinary ones from 10 to 12 years.

*These pine knots were used by Mr. M. V. Murphy, Government Surveyor, for pegs, whenever available. Collins (2nd ed. p. 125) speaks of the people using the knots of the pine tree, "split and made into small bundles, as torches."

B. CRYPTOGRAMMÆ.

i. PTERIDOPHYTA.

a. Filicinæ.

The classification of the ferns is still in a somewhat unsettled condition. In the following pages, I have followed, as far as I could, the arrangement that Mr. Betche and I propose to follow in our forthcoming Census of the Plants of New South Wales.

I have drawn attention to some points that require clearing up. In some cases, in translating names to their now accepted equivalents, it has occurred to me that the finds require confirmation.

HYMENOPHYLLACEÆ.

1. HYMENOPHYLLUM MULTIFIDUM, Swartz.—The ubiquitous *H. tunbridgense* does not appear to have been found on the Island.

2. TRICHOMANES APIIFOLIUM, Presl. (*T. Bauerianum*, Endl., Prod. Norf. 50).

“The Peperomias grow also on moist rocks, on the dark sides of which *Trichomanes Bauerianum*, a membranaceous fern, of great beauty, forms tufts exceeding a foot in height” (Backhouse, 267).

3. TRICHOMANES HUMILE, Forst., Endl., Prod. Norf. 49.

POLYPODIACEÆ.

4. VITTARIA ELONGATA, Swartz (*V. rigida*, Kaulf., Endl., Prod. Norf. 35.—On tree-fern stumps; is possibly a variety of the type).

5. POLYPODIUM TENELLUM, Forst. (*Arthropteris tenella*, J. Sm.: *P. tenellum* in Endl., Prod. Norf. 18).

Diels (Pflanzenfamilien) separates *Arthropteris* from *Polypodium* on account of the articulate pinnae.

6. POLYPODIUM SERPENS, Forst. (*Niphobolus rupestris*, Kaulf.: *N. serpens*, Endl., Prod. Norf. 21).

Niphobolus serpens, Endl., seems to be synonymous with *Polypodium serpens*, Forst., though *Niphobolus rupestris* is the only

Niphobolus given as synonymous by Hooker & Baker and Bentham.*

“*Niphobolus serpens* and *Polypodium tenellum*, two climbing ferns, ascend the trunks of the trees, in the northern portion of the Island” (Backhouse, 271).

7. POLYPODIUM CONFLUENS, R.Br., B.Fl. vii. (*P. glabrum*, Mett., Christ; *P. acrostichoides*, Sieb., non Forst.: *Niphobolus confluens*, R.Br., Nat. Pfl. Fam.).

Apparently not previously recorded from the Island, unless the following, which I cannot find in any list of synonyms, is the fern in question:—

“*Drymoglossum carnosum*, J. Sm., Journ. Bot. v. 4, p. 66. *Niphobolus carnosus*, Blume, Fl. Jav. t. 19? On rocks” (A. Cunn., in Heward).

8. POLYPODIUM ACROSTICHOIDES, Forst. (*Niphobolus acrostichoides*, Bedd.)—Recorded by Mueller in Carne’s List.

9. POLYPODIUM PUSTULATUM, Forst. (Syn. *P. Billiardieri*, R.Br., Endl., Prod. Norf. 19: *P. scandens*, Forst.).

Hooker & Baker (in Synops. Filic.) give *P. pustulatum*, Forst., and *P. Billiardieri*, R.Br., as distinct species; while Bentham (B.Fl. vii.) and Christ unite them. *P. scandens*, Forst., is *P. pustulatum*, Forst., according to Christ (Farnkräuter der Erde).

Our herbarium material from Norfolk Island consists of only one species, viz., *P. pustulatum*, Forst.

10. POLYPODIUM PHYMATODES, Linn.

“*Polypodium phymatodes*, *Drynaria vulgare*, J. Sm., Journ. Bot. v. 4, p. 61; Linn., Mant. p. 306; Schk. Crypt. t. 9. On decayed timber in damp woods” (A. Cunn., in Heward).

11. PHEGOPTERIS PUNCTATA, (Thunb.) Bedd. (*Polypodium rugosulum*, Labill., Endl., Prod. Norf. 20: *Polypodium punctatum*, Thunb., B.Fl. vii. 764: *Nephrodium punctatum*, Diels?).—Both Christ and Diels separate *Polypodium punctatum* from *Polypodium* on account of the totally different habit and vena

* Diels (Pflanzenfamilien) separates *Niphobolus* from *Polypodium*. Bentham, Hooker, Baker and Christ unite it with *Polypodium*.

tion. Christ united all the *Aspidium*-like ferns without indusium under the genus *Phegopteris*; while Diels places them under various genera chiefly according to the venation.

12. *ADIANTUM AFFINE*, Willd., Endl., Prod. Norf. 44.

13. *ADIANTUM HISPIDULUM*, Swartz. (*A. pubescens*, Schk., Endl., Prod. Norf. 43).

14. *ADIANTUM DIAPHANUM*, Blume.—I cannot find that this has been previously recorded from the Island.

15. *CHEILANTHES TENUIFOLIA*, Swartz, var. *SIEBERI*. (*C. Sieberi*, Kunze).

C. tenuifolia, recorded by Mueller (Journ. Bot. xxii. 290), *C. Sieberi*, Kunze, and *C. tenuifolia*, Swartz, are distinct species in Hooker and Baker's Synops. Filic., but are united in B.Fl. vii. Christ ignores *C. Sieberi*.

C. arborescens, Sw., Endl., Prod. Norf. 45, and *C. dicksonioides*, Endl., Prod. Norf. 46, I cannot trace anywhere else. Judging from the descriptions, they both appear to be *C. tenuifolia*.

16. *NOTHOCHLAENA DISTANS*, R.Br., Prod. 146, 1810. (Syn. *Cheilanthes distans*, A.Br.).—Recorded as *Cheilanthes* from the Island in B.Fl. vii. 774.

Christ and Diels (in Nat. Pfl. Fam.) both spell the genus *Nothochlaena*, and separate it from *Cheilanthes*. In New South Wales we have *Cheilanthes tenuifolia*, also *Nothochlaena distans* and *vellea*.

The chief distinction between the genera is:—

Cheilanthes—Veins distinctly thickened at the end. Margin of the fronds recurved.

Nothochlaena—Veins scarcely thickened at the end. Margin of the fronds scarcely recurved.

17. *PELLÆA ROTUNDIFOLIA*, Hook. (*Pteris rotundifolia*, Forst.)—Recorded in B.Fl. vii. 730, as *Pteris*.

18. *PTERIS TREMULA*, R.Br. (*Pteris arguta*, F.v.M., not Ait.).—Mueller united it erroneously with the European *P. arguta*, Ait., which it closely resembles. Recorded in B.Fl. vii. 731.

Pteris tremula, B.Br., var. *Kingiana*, Hook. and Baker, Synops. Fil. p. 161. (*P. Baueriana*, Endl., Prod. Norf. 40).

P. Baueriana, Endl., Prod. Norf. 37, appears to be a form of *P. tremula*.

19. PTERIS AQUILINA, Linn., var. ESCULENTA. (*P. esculenta*, Forst., Endl., Prod. Norf. 36 : *Pteridium aquilinum*, Kuntze).—*Pteris aquilina* is separated in the Nat. Pfl. Fam. from the genus *Pteris*, as *Pteridium*, on account of its double indusium.

20. PTERIS QUADRIAURITA, Retz.—*P. Trattinickiana*, Endl., Prod. Norf. 42, and *P. Zahlbruckneriana*, Endl., Prod. Norf. 41, both appear, from the descriptions, to be *P. quadriaurita*, but I am doubtful. *P. quadriaurita* is a new record for the Island.

21. PTERIS INCISA, Thunb. (*Histiopteris incisa*, Thunb., Agardh). Recorded by Mueller in Carne's List. Perhaps *P. Brunoniana*, Endl., Prod. Norf. 38, is the species.

22. PTERIS MARGINATA, Borz.—Recorded by Mueller (Journ. Bot. xxii. 290).

23. PTERIS COMANS, Forst., Endl., Prod. Norf. 39.

ASPLENIACEÆ.

24. BLECHNUM* DISCOLORUM, Forst. (*Lomaria discolor*, Willd.) — This species does not appear to have been previously recorded.

25. BLECHNUM LANCEOLATUM, Spreng. (*Lomaria lanceolata*, Spreng. : *Stegania lanceolata*, R.Br., Endl., Prod. Norf. 34).

Perhaps this and the following are identical, or *B. Norfolkianum* with *acuminatum*.

Blechnum Norfolkianum, Hew.

“*Lomaria norfolkiana*, Hew. (nov.sp.) (*Stegania*, A. Cunn. MSS.), frondibus glabris lanceolatis pinnatifidis, laciniis sterilibus subfalcatis acuminatis integris apice subdentatis : infimis semiorbicularibus, fertilibus angustioribus: Frons sterilis bipedalis glabra. Pinnæ 3-4 pollicares. On the margins of water courses in shady ravines.”

* *Lomaria* is merged in *Blechnum* by both Christ (Farnkräuter) and Diels (Pflanzenfamilien).

“This fern, which I apprehend is the same that Endlicher has taken up as *Stegania lanceolata*, R.Br., is very distinct from the Van Dieman's Land plant, resembling considerably more *Lomaria acuminata*, Desv., a native of the Mauritius, but that fern has not the semi-orbicular laciniae of the Norfolk Island plant” (Heward's “Biographical Sketch of Allan Cunningham”).

It seems strange that this name is ignored by all modern pteridologists.

26. BLECHNUM ACUMINATUM, J. G. Baker. (*Lomaria acuminata*, Baker), Hook. and Baker, Syn. Filic. 481.—Intermediate between *B. attenuata* and *B. lanceolata*.

27. DOODIA ASPERA, R.Br.

28. DOODIA MEDIA, R.Br., var. KUNTHIANA (*D. Kunthiana*, Gaud., Endl., Prod. Norf. 33).

29. DOODIA CAUDATA, R.Br. (*Woodwardia caudata*, Cav. : *D. caudata*, in Endl., Prod. Norf. 32).—In Hooker and Baker's Syn. Filic. the following species and varieties of *Doodia* are given:—

D. aspera, R.Br., *D. media*, R.Br., *D. media*, var. *Kunthiana*, *D. caudata*, R.Br.

Bentham considers *D. aspera* and *caudata* as good species, but reduces *D. media* to a var. of *D. caudata*.

Christ considers *media* and *caudata* as good species, but *Doodia aspera*, the most common of all, he does not mention. Engler and Prantl agree with Hooker and Baker, so I propose to follow the Synops. Filic.

30. ASPLENIUM NIDUS, Linn., Endl., Prod. Norf. 26.

31. ASPLENIUM ROBINSONII, F.v.M., Journ. Bot. xxii. 289. In Journ. Bot. xxiii. 353, he says:—

“While offering these remarks on a long misunderstood plant of Norfolk Island, it may not be out of place to note that the great fern investigator, Mr. J. G. Baker, refers to *Asplenium Robinsonii* as the doubtful recorded variety of *A. squamulatum* of Hooker's Spec. Filicum, iii. 83, the origin of which had remained for very many years obscure; this particular fern, now shown to be a native of Norfolk Island, is evidently not identical with Blume's *A. squamulatum* of Java, Borneo and the Philippine Islands, but probably endemic to the far-isolated oceanic spot as a remnant of a bygone vegetation, where indeed it is now nearly extinct, as trading horticulturists

have carried away three of the only five individual plants known from various spots of the island. Mr. Robinson writes concerning this fern, that in habit it is not unlike *A. Nidus*, so far that four fronds gathered from one plant could scarcely be missed, and that all fronds appeared fructified, yet it shows no inclination for natural dispersion; specimens lately received exhibit the spikes semiterete and channelled, and the apex of the frond acute."

For a note on the supposed occurrence of this fern in Lord Howe Island, see these Proceedings, 1898, p. 146.

32. *ASPLENIUM OBTUSATUM*, Forst. var. *DIFFORME*. (*A. difforme*, R.Br., Endl., Prod. Norf. 28: *A. marinum*, F.v.M. not Linn.).

According to Hooker & Baker (Synops. Filic. 207) and Christ (p. 197), this variety is a form of the species with the pinnae cut nearly down to the rhachis.

"On the rocks of the south coast, *Asplenium difforme*, a fern resembling the Sea Spleenwort, *Asplenium marinum*, of England, is found. At a short distance from the shore, its leaves become more divided, and in the woods, in the interior of the Island, they are separated into such narrow segments that the lines of fructification are thrown upon their margins. It then becomes *Canopteris odontites*. But every possible gradation is to be met with between this state and that in which it grows on rocks washed by the sea" (Backhouse, p. 267).

Backhouse's description of the coast form and the form of the interior does not agree with Hooker, Baker and Christ's opinion that *A. difforme*, R.Br., is a form of *A. obtusatum*.

33. *ASPLENIUM DIVERSIFOLIUM*, A. Cunn., Endl., Prod. Norf. 29 (*A. dimorphum*, Kunze).—On stems of tree-ferns (Endlicher).

34. *ASPLENIUM FALCATUM*, Lam. (not Swartz, as in Endl., Prod. Norf. 27).

Asplenium falcatum, Lam. var. *caudatum* (*A. caudatum*, Forst.).

A. falcatum, Lam., and *A. caudatum*, Forst., are kept distinct by Hooker and Baker, and also by Christ; Bentham united them. They are certainly not synonymous; the question is whether *A. caudatum* is a variety of *A. falcatum*, or whether they are distinct species.

35. *DIPLAZIUM JAPONICUM*, Thunb. (*Asplenium japonicum*, Thunb.).

Engler and Prantl, also Christ, constitute the section *Diplazium* of *Asplenium* as a separate genus. As *Asplenium*, Mueller (Carne's list) records it from Norfolk Island.

36. *ATHYRIUM UMBROSUM*, Presl. (*Asplenium umbrosum*, J. Sm.: *Allantodia australis*, R.Br., in Endl., Prod. Norf. 31 : *Asplenium australe*, Brack.).

Athyrium umbrosum, Presl., var. *assimile*, Hook. and Baker, Synops. Filic. (*Asplenium assimile*, Endl., Prod. Norf. 30).

Christ, also Engler and Prantl, separate *Athyrium* from *Asplenium*. A. Cunningham in Heward has the note "*Asplenium assimile*, Endl., Prod. p. 10, is *Allantodia australis*, R.Br." But according to Synops. Filic. p. 229, *Allantodia*, R.Br., is synonymous with *Asplenium umbrosum*, J. Sm., and not with its var. *assimile*.

37. *ATHYRIUM BREVISORUM*, Wall.* (*Asplenium brevisorum*, Wall., Synops. Filic. p. 228).—This appears to be a new record for the Island.

ASPIDIACEÆ.

38. *ASPIDIUM PARASITICUM*, Mett. (*Polypodium parasiticum*, Linn. : *Nephrodium parasiticum* (Linn.), Baker : *Nephrodium molle*, R.Br. : † *Aspidium molle*, Swartz).

Christ and Diels agree that *parasiticum* should be the specific name, though they differ about the genus. Diels separates *Nephrotium* from *Aspidium* as a genus. Christ concurs with Bentham and Mueller in leaving *Nephrodium* with *Aspidium*.

The plant is recorded from the Island as *A. molle*, Sw., by Mueller in Journ. Bot. xxii. 290.

"*Nephrodium remotum*, Hew. (nov.sp.) frondibus pubescentibus lanceolatis pinnatis, pinnis lineari-lanceolatis sessilibus oblique crenatis ciliatis apice attenuatis integerrimis; infimis remotis subtriangularibus, sori medio venarum insidentibus. Frons 2-3 pedalis. Stipes venaque pubescentes. Indusium reniforme pilosum. Shaded woods. This fern belongs to a section of *Nephrodium* extremely difficult to determine specifically, but the character

* As *Asplenium*.

† In Syn. Filic. the author is given as Desv.

of the lower pinnae being so very distant (3 to 4 inches), and their nearly triangular form will distinguish it from its congeners. Found also at Timor, 1819" (Heward's "Biographical Sketch of A. Cunningham").

I cannot find *N. remotum*, Hew., anywhere else. *N. remotum*, A.Br., in Synops. Filic., has evidently nothing to do with this plant. If it is a good species the difficulty is under what genus to place it. In Christ's system, as already stated, *Nephrodium* has been eliminated.

Christ separates *Nephrolepis* and *Phegopteris* from *Aspidium*, as used by Bentham (B.Fl.), but writes *Nephrodium* and *Aspidium*. Perhaps *Nephrodium remotum*, Hew., or *Aspidium remotum*, according to the classification used, is synonymous with *A. parasiticum*, Mett.

39. ASPIDIUM ARISTATUM, Swartz, Endl., Prod. Norf. 23 (*Polystichum aristatum*, Presl.). See *A. decompositum*, Spreng.

40. ASPIDIUM CAPENSE, Willd. (*A. coriaceum*, Swartz, Endl., Prod. Norf. 22: *Polystichum capense*, Sm.).

41. ASPIDIUM DECOMPOSITUM, Spreng. (*Nephrodium decompositum*, R.Br., and *N. microsorum*, Endl., Prod. Norf. 24, and *N. calanthum*, Endl., Prod. Norf. 25 probably).

A. Cunn. in Heward states:—

"*Nephrodium microsorum*, Endl., and *N. calanthum*, Endl., Prod. p. 9, I have little hesitation in considering the same plant, the latter having its sori somewhat more elaborate. At the same time, from comparison of specimens in the Banksian herbarium, I have every reason to believe the two plants are identical with *Aspidium (Polystichum) aristatum*, Sw."

But *Nephrodium microsorum*, Endl., and *N. calanthum*, Endl., seem to be both identical with *Aspidium decompositum*, Spreng., (*Nephrodium decompositum*, R.Br.). Endlicher distinguishes between the genera *Aspidium* and *Nephrodium* (*Aspidium: indusium orbicular*, peltately attached. *Nephrodium: indusium reniform*, attached in the sinus); and as *Nephrodium microsorum* and *N. calanthum* have both a reniform indusium, they cannot be identical with *Aspidium aristatum*.

Nephrodium microsorum and *N. calanthum* are only distinguished by the one being more membranous than the other;

and one has "rather acutely lobed pinnae" and the other "very acutely lobed pinnae," a difference readily accounted for by the variation in the forms of *A. decompositum*.

Aspidium decompositum, Spreng., (described 1827), has a wide range, from Australia to New Zealand and the Pacific Islands, and is very variable in size, outline and hairiness, so that its occurrence in Norfolk Island is probable.

42. ASPIDIUM TENERUM, Spreng. (*Nephrodium tenerum*, R.Br.)—Recorded by Mueller in Carne's list.

43. ASPIDIUM SETIGERUM, Blume. (*A. uliginosum*, Kunze : *A. tenericaule*, Thw.).—Recorded by Mueller (Journ. Bot. xxii. 290) as new for the Island, under the name of *A. uliginosum*.

44. PHEGOPTERIS PUNCTATA, Thunb., Bedd. (*Polypodium punctatum*, Thunb : *P. rugulosum*, Labill.).—Perhaps a new record.

45. HYPOLEPIS TENUIFOLIA, Benth.—A hairy variety of the species (as collected by Mr. Boorman and myself). Recorded as new for the Island by Mueller (Journ. Bot. xxii. 290).

DAVALLIACEÆ.

46. NEPHROLEPIS CORDIFOLIA, Presl. (*Aspidium cordifolium*, Bory).—Recorded as new for the Island by Mueller (Journ. Bot. xxii. 290).

47. LINDSAYA LINEARIS, Sw.—Recorded from the Island in B.Fl. vii. 719.

48. DAVALLIA PYXIDATA, Cav.—Recorded from the Island in B.Fl. vii. 716.

49. DENNSTÆDTIA DAVALLIOIDES, T. Moore. (*Dicksonia davallioides*, R.Br. : *Davallia dicksonioides*, F.v.M.)—Recorded from the Island in B.Fl. vii. 713 as *Dicksonia*.

CYATHEACEÆ.

Cyathea medullaris, Swartz, Endl., Prod. Norf. 47.

"*Cyathea medullaris*, Sw., has been enumerated by Endlicher (Prod. p. 15) as a native of Norfolk Island; Mr. Cunningham did not find it, and says :— 'This fern tree is not indigenous to Norfolk Island; it was not seen there by

Ferd. Bauer,* nor has it been since observed by other botanists. Mr. Brown has ascertained that it is not noted by Forster, in his herbarium, as a native of Norfolk Island, and it is therefore probable that Endlicher on reading Lieut.-Govr. King's remarks in Hunter's Voyage, p. 313, had concluded that it referred to *Cyathea medullaris*, a plant found only in New Zealand, and has on this conclusion inserted it. Lieut.-Govr. King thus describes the Norfolk Island plant:—"This tree grows to the height of 80 feet (one trunk which I felled in 1830 measured 57 feet without the fronds, A.C.) and the branches, which resemble those of the palm tree in their growth, fall off every year, leaving an indentation on the trunk. The leaves of these branches, which are twelve in number, are much like the heath fern, from whence this tree obtained the name of the fern-tree. The middle of the tree, from the root to the apex, consists of a white substance resembling a yam, and when boiled it tastes like a bad turnip; this the hogs feed on very eagerly; the outside of the trunk is hard wood, and full of regular indentations from the top to the bottom. The tree is found in great plenty in all parts of the Island.' This is the *Alsophila excelsa* of Mr. Brown, of which the late Ferd. Bauer made some magnificent drawings during his stay on the Island in 1804" (Heward).

"I explored some of the gullies on the south of Mount Pitt. Here two tree-ferns, *Alsophila excelsa* and *Cyathea medullaris* were very fine; the former measured 40 feet, and the latter 20 feet, in height; both had magnificent circular crests of fronds: those of the *Cyathea* were 11 feet in length" (Backhouse, p. 273).

Under *C. medullaris*, Swartz, Hooker (Hdbk. N.Z. Flora, 349) says of the New Zealand plant:—

"This differs from the Norfolk Island and Pacific Island allied species in the fertile pinnæ being always lobulate, or almost pinnatifid. The thick mucilaginous pith was once an article of food with the natives."

Bentham (B.Fl. vii. 709) includes in the range of this species "Malayan Archipelago and the South Pacific Islands."

50. *ALSOPHILA EXCELSA*, R.Br., Endl., Prod. Norf. 48.—A MS. says:—

"Tree fern *Alsophila excelsa* measures 40 feet in height and has a magnificent crest of fronds; the black portion of the trunks is used for stringing by cabinetmakers."

* A letter from Mueller contains the passage:—" *Cyathea medullaris*. This tree-fern, besides *Alsophila excelsa*, was found by Bauer." I could not find it at Norfolk, and believe there is only one tree-fern on the Island. I do not understand Backhouse's specific statement that he saw two.

Dr. Metcalfe told me that the fern grew up to 60 feet in height. It is, or has been, so abundant that I saw a corduroy road of Tree-fern stems!

Lieut.-Govr. King writes, presumably referring to this species:

"The fern-tree is, likewise, found of a good height, measuring from seventy to eighty feet, and affords good food for the hogs, sheep, and goats, all which thrive" (Hist. Rec. N.S.W. Vol. i. Pt. 2, p. 187).

A. australis, R.Br., is (in B.Fl. vii. 711) recorded from Norfolk Island in the following words:—

"In the typical *A. australis*, chiefly from N.S. Wales and Tasmania, but also among Queensland and Norfolk Island specimens, the ultimate pinnules are thin, rather acute, barren and serrulate at the end, the sori not reaching beyond the middle. In the Norfolk Island form originally described as *A. excelsa*, the pinnules are longer, narrower, thicker, obtuse with recurved margins, soriferous and entire or obscurely crenate to the end. But some Norfolk Island specimens are the precise counterpart of Brown's from King's Island."

Tate follows Bentham in recording *A. australis* and excluding the name *A. excelsa* from Norfolk Island. In my opinion *Alsophila excelsa*, R.Br., from Norfolk Island, and *A. australis*, R.Br., are perfectly distinct species.

Bentham, working only on herbarium material, united *A. excelsa*, as well as *A. Cooperi* with *A. australis*; but he would hardly have done so if he had seen the living plants.

Alsophila australis has a rough stem, studded with the prickly bases of the stalks of the fronds; while *A. excelsa* and *A. Cooperi* have smooth stems; the fronds drop off completely, leaving a smooth scar on the stem. *A. australis* is also more prickly, less scaly-hairy, and altogether different in habit from *A. excelsa* and *A. Cooperi*.

Mueller, in his Census, followed R. Brown, and kept *A. excelsa* and *A. australis* apart as distinct species; and I think that is the correct view.

I believe Mueller united *A. Cooperi* and *A. excelsa*, and the note in Census, "*A. excelsa* . . . N.S.W. . . Q.," refers to *A. excelsa* from Norfolk, and *A. Cooperi* from Australia.

MARATTIACEÆ.

51. MARATTIA FRAXINEA (*M. elegans*, Endl., Prod. Norf. 17).

"The most remarkable object that arrested our attention was *Marattia elegans*, a fern of great beauty, having fronds 14 feet in length, 7 feet of which were destitute of branches; of these it had $8\frac{1}{2}$ pairs, which were again branched, and clothed with leaflets, five inches long, and three-quarters of an inch broad" (Backhouse, p. 272).

I learnt that the Norfolk Island name (as also that of Pitcairn) for the plant is Neh-e (pronounced Neche-e, with a peculiar nasal sound, to imitate ba-a of a lamb). I did not think to ask the meaning of the allusion to the lamb, but the so-called Scythian or Tartarian lamb has since occurred to me. This lamb consists of the shaggy caudex of a fern with portions of the stipes for legs. See *Cibotium* (Treasury of Botany) for a full account of this fabulous animal. *Marattia* would not make so good a lamb as *Cibotium*.

OPHIGLOSSACEÆ.

52. OPHIGLOSSUM VULGATUM, Linn.—Recorded as new by Mueller (Journ. Bot. xxii., 290).

b. Lycopodinæ.

1. LYCOPODIUM DENSUM, Labill.—Recorded in B.Fl. vii. 676.

2. TMESIPTERIS TANNENSIS, Bernh. (*T. Forsteri*, Endl., Prod. Norf. 16; probably syn. with *T. tannensis*).—On tree-ferns.

3. PSILOTUM TRIQUETRUM, Sw., Fil. p. 187; Schk., Crypt. t. 165 b.
*—"On decayed trees in shaded woods" (A. Cunn. in Heward).

ii. BRYOPHYTA.

a. Musci.

ORTHOTRICHEÆ.

1. MACROMITRIUM PROREPENS, Hook. (Endl., Prod. Norf. 6, as *Leiotheca*).

BRYEÆ.

2. BRYUM ANGEIOTHECIUM, C.M. (Hedwigia, 1898, 108).

3. BRYUM CANARIENSE, Brid. (Endl., Prod. Norf. 5).

4. RHIZOGONIUM SPINIFORME, Linn. (Endl., Prod. Norf. 8, as *Rhizogonium*).

RHACOPILEÆ.

5. RHACOPILUM TOMENTOSUM, Brid. (Endl., Prod. Norf. 11).

STEREODONTEÆ.

6. ISOPTERYGIUM INTORTUM, P.B. (Endl., Prod. Norf. 7, as *Hypnum*).

HYPNEÆ.

7. HYPNUM CIRCINALE, Hook. (Endl., Prod. Norf. 9).

8. THUIDIUM MINUTULUM, Hedw. (Endl., Prod. Norf. 9, as *Hypnum*).

b. Hepaticæ.

JUNGERMANNIACEÆ.

1. PLAGIOCHILA SINCLAIRII, Mitt.

2. JUNGERMANNIA ARGUTA, Nees ab E. (Endl., Prod. Norf. 12).

3. J. DUBIA, Nees ab E. (Endl., *l.c.* 15).

4. J. ENDLICHERIANA, Nees ab E. (Endl., *l.c.* 13).

5. J. SECURIFOLIA, Nees ab E. (Endl., *l.c.* 14).

6. LOPHOCOLEA CILIATA, Steph.

7. BRYOPTERIS VITTATA, Mitt.

8. OMPHALANTHUS CONVEXUS, Steph.

MARCHANTIACEÆ.

9. MARCHANTIA POLYMORPHA, Linn.

ANTHOCEREÆ.

10. ANTHOCEROS LEVIS, Linn.

(The Hepatics, other than *Jungermannia*, were recorded by Mueller in Journ. Bot. xxiii. 353.)

iii. THALLOPHYTA.

a. Lichenes.

Mr. E. Cheel, Botanic Gardens, Sydney, has kindly given me the following statement of the Norfolk Island Lichen-flora, so far



as has been ascertained at present. Those marked F. v. Mueller in brackets were communicated by that botanist in a letter. The determinations were by Mueller Arg., and I do not know whether they have been previously published. The remainder, unless otherwise indicated, were collected by Mr. Boorman and myself.

Order **Collemaceæ.**

Tribe **COLLEMEÆ.**

1. **LEPTOGIUM TREMELLOIDES**, Linn.
2. **PHYSMA BYRSINUM**, Ach.—On trunk of *Pittosporum bracteolatum*.

Order **Discocarpeæ.**

Series **THAMNO-PHYLLOBLASTEÆ.**

Tribe **USNEÆ.**

3. **USNEA BARBATA**, Ach., and var. **FLORIDA** (Linn.), Fr.—On dead branches.

4. **U. INTERCALARIS**, Krp.—On dead branches. *Usnea* is common on the Pines from top to bottom on the W. side.

5. **EVERNIA MELAXANTHA**, Ach., Endl., Prod. Norf. 4.

It is quite probable this is meant for *Neuropogon melaxantha*, Nyl. *Neuropogon melaxantha*, however, has never, so far as I can ascertain, been found in other than Arctic and Antarctic regions, or on very high mountains. Specimens in the National Herbarium, Sydney, are from Mt. Wellington, Tas., Mt. Macedon, Vic., and from mountains 3000 feet high in New Zealand. There are also specimens from Mt. Kosciusko, N.S.W., collected by J. H. Maiden.

Tribe **RAMALINEÆ.**

6. **RAMALINA LEIODEA**, Nyl., var. **FASTIGIATA**, Muell. Arg.—On dead branches in company with *Usnea florida*.

7. **R. FARINACEA**, Linn.—On dead branches in company with *R. fastigiata*.

R. thrausta (Ach.), Fr.?—Only fragmentary specimens were present, in company with *Thelochistes flavicans*.

8. *R. scopulorum*, Ach.—On trunks of *Araucaria excelsa* (A. Cunn. in Heward).

It is quite probable that this species may occur in Norfolk Island, but it is questionable if those plants collected by A. Cunningham on trunks of *Araucaria* are the true *R. scopulorum* of Acharius, as they have never (so far as I can ascertain) been found on other than maritime rocks.

Tribe STICTEÆ.

9. *STICTA AURATA*, Ach.—On decaying logs. Previously recorded in Endl., Prod. Norf. 3.

Tribe PARMELIÆ.

10. *PARMELIA PERLATUS*, Linn.—On dead branches. Previously recorded in Endl., Prod. Norf. 1.

Tribe PHYSCIEÆ.

11. *THELOCHISTES FLAVICANS*, Sw.—Sterile.

12. *PHYSCIA CÆSIA*, Hoffm.—On bark. Previously recorded in Endl., Prod. Norf. 2, as *Parmelia cæsia*, Ach.

13. *P. CONFLUENS*, Mitt.—Sterile. On branches of trees.

14. *ANAPTYCHIA CILIARIS* (Linn.), Kærb.?—The laciniae are more tubulose-inflated than those of the specimens in the National Herbarium. The spores are the same.

Series KRYOBLASTEÆ.

Tribe PYXINEÆ.

15. *PYXINE COCOES*, Sw.—On bark.

Tribe PHYLLOPSOREÆ.

16. *PSORA PARVIFOLIA*, Muell. Arg. (F. v. Mueller). (Syn. *Lecidea parvifolia*, Pers. = *Lecanora bibula*, Tayl., in Shirley's Lich. Fl. Queensl. p. 106 = *Lecidea brevinscula*, Nyl., in Shirley, l.c. p. 107, vide list of synonyms, l.c. p. 196.

Tribe LECANOREÆ.

Lecanora pallescens, Fr.?—Only fragmentary specimens of this were present. Spores undeveloped; probably as above named.

Pertusaria sp.—On bark, only fragments were present; more specimens required to give it specific rank.

Tribe LECIDEÆ.

17. PATELLARIA VERSICOLOR, Fée.—On bark.
18. P. GROSSA, Muell. Arg. (F. v. Mueller).
19. HETEROTHECIUM BIFLORUM, Nyl. (F. v. Mueller).

Tribe CÆNOGONIEÆ.

20. CÆNOGONIUM IMPLEXUM, Nyl. (F. v. Mueller).

Tribe GRAPHIDEÆ.

21. GLYPHIS VERRUCOSA, C. Kn.—On trunks of trees.
22. CHIODECTON PERPLEXUM, Nyl. (F. v. Mueller).

Order **Pyrenocarpeæ.**

Tribe PYRENULEÆ.

Parmentaria sp., probably *P. havenlii*, Tulk.—Specimens are very young; older ones required for identification.

Pyrenula sp., probably *P. nitida*, Ach.—On decorticated bark.

23. CLATHROPORINA EMINENTIOR, Nyl. (F. v. Mueller).

b. Fungi.

The following list of fungi for the Island was published by Mueller:—

1. HYMENOCHETE PURPUREA, C. & M.
2. DALDINIA VERNICOSA, Fries.
3. TREMELLA LUTESCENS, Fries.
4. THELEPHORA CAPERATA, Berkeley.
5. POLYPORUS AUSTRALIS, Fries.
6. P. HIRSUTUS, Fries.

7. *XYLARIA SCHWEINITZII*, Berkeley.

8. *HYPOCREA FUSAROIDES*, Berkeley.

9. *STEREUM LOBATUM*, Kunze.

To which are to be added:

10. *POLYPORUS SANGUINEUS*, Meyer.

11. *HIRNEOLA AURICULA-JUDÆ*, Fries.

And a species of

12. *ASEROE* (Journ. Bot. xxiii. 353-54).

The Jew's Ear fungus (*Hirneola*) is a regular article of export from the Island. It is chiefly collected on Wild Tobacco (*Solanum auriculatum*), Pine (*Araucaria excelsa*), and White Oak (*Lagunaria Patersonii*). The Chinese are said to extract a dye from it; they eat the jelly.

Mr. A. Grant informs me that an *Agaricus* (Section *Pleurotus*) is probably referred to in the following passage:—

“Being out after dark, we were interested by seeing numbers of a small species of agaric, or mushroom, so luminous as to reflect a shadow on substances near them. When held near a watch, the hour might be distinctly seen, or on being put near the face, the features might be discovered. This remarkable fungus has attained the name of Bluelight, though its radiance is rather green than blue; it grows from decaying sticks or straw, and is very abundant amongst the sugar-canes, as well as in the bush. Its cap is rather convex, covered with mucilaginous matter, and is less than an inch across; the stalk is slender, two or three often grow together; the whole plant is very watery. The brilliancy is greatest in the cap, which shines most on the under side” (Backhouse, p. 275).

Mr. Boorman and I collected a number of fungi, and Mr. A. Grant, of the Botanic Gardens, informs me that one of them

13. *LENTINUS EXILIS*, is new for the Island.

c. *Algæ*.

Mr. A. H. S. Lucas, M.A., B.Sc., writes:—“Among the *Algæ* collected by Mr. Robinson, yourself, and Mr. Boorman on Norfolk Island in Nov., 1902, I have been able to determine the following species, viz. :—

1. *PADINA PAVONIA* (L.), Lamx.

2. *PADINA DURVILLEI*, Bory.
3. *DICTYOLA DICHOTOMA* (Huds.), Lamx.
4. *GELIDIUM LATIFOLIUM*, Bornel.
5. *PTEROCLADIA LUCIDA* (R.Br.), J. Ag.
6. *PLOCAMIUM HAMATUM*, J. Ag.
7. *CHAMPIA PARVULA* (Ag.), J. Ag.
8. *AMPHIROA ANCEPS*, Lamx.
9. *A. EPHEDREA*, Lamx.
10. *ULVA LETE-VIRENS*, Areschoug.

There are seven or eight others which require further consideration." I am not aware that a list of Algæ from Norfolk Island has previously been published.

Plocamium has been previously recorded from the Island.

Introduced Plants.

List A.—Natives of Australasia.

It is very important that a list should be kept of Australasian plants which have been introduced from the mainland. Without such a record it is quite possible that some of them might be deemed to be indigenous, and hence erroneous deductions as to plant distribution might readily be made.

PITTOSPOREÆ.

PITTIOSPORUM UNDULATUM, Vent., is known as "Snowdrop-tree" in the Island. I have no doubt that it is not indigenous. It occurs on the site of the old Government garden at the Cascades and in other places where it has been doubtless planted.

MELIACEÆ.

MELIA AZEDARACH, "White Cedar." Very common, and looked upon by some of the Islanders as indigenous.

CEDRELA AUSTRALIS, F.v.M., "Red Cedar." One or two planted trees on the Island.

LEGUMINOSÆ.

ALBIZZIA LOPHANTHUS, Benth.—A native of Western Australia and well acclimatised. Known as “Wattle.”

ACACIA MELANOXYLON, R.Br.—“Blackwood” of the mainland. Planted by Col. Spalding.

CASTANOSPERMUM AUSTRALE, A. Cunn.—“Moreton Bay Chestnut.” In various places and up to 3-4 feet in diameter.

ERYTHRINA sp.—Known as “Willow.”

MYRTACEÆ.

CALLISTEMON LANCEOLATUS, DC —In a garden near the Cascades. There when the Pitcairners arrived.

METROSIDEROS VILLOSA (Syn. *M. polymorpha*, Gaud.).—“Pohutukawa” of N.Z. Planted in the Melanesian Mission Ground.

EUCALYPTUS GLOBULUS, Labill.—“Tasmanian Blue Gum.” An avenue planted on Mr. Buffett’s property, Steel’s Point, as a breakwind. Isolated trees in other parts.

EUCALYPTUS CALOPHYLLA, R.Br.—From Western Australia. A fine tree in “Nat’s” Garden in Ferny Lane. There are others.

VERBENACEÆ.

VITEX LITORALIS, Forst. This is also found in New Zealand. There is nothing inherently improbable in its being indigenous to Norfolk Island. I saw several trees growing among other trees (indigenous), but I was informed they had been planted.

PROTEACEÆ.

HAKEA aff. *aciculari*, but differing in the long hairy leaves. It was introduced by the Melanesian Mission many years ago as a hedge, but has not proved a success. It cannot be determined in the absence of flowers. It is 8 ft. high and 10 ft. broad.

THYMELEACEÆ.

PIMELEA LINIFOLIA, Sm., Endl., Prod. p. 46.

“Certainly not indigenous to Norfolk Island, and if it ever grew there it must have been introduced from Port Jackson by the first settlers as an

ornamental plant, and upon the island being abandoned in 1807, the plant left to itself must have died, not liking that continued humid atmosphere which prevails during the winter months. I found no trace of it in 1830" (A. Cunn. MSS. in Heward).

I also searched in vain for the plant.

P. longifolia, Bks. & Sol., of New Zealand and Lord Howe Island, does not appear to extend to Norfolk Island.

EUPHORBIACEÆ.

ACALYPHA sp., from Fiji, is commonly found in gardens.

HOMALANTHUS POPULIFOLIUS, Grah., found in Lord Howe Island and in other South Sea Islands, is not indigenous, I believe, to Norfolk Island. I found a flourishing tree on Colonel Spalding's land; but that gentleman informed me it had come as a seedling with some plants from Lord Howe Island. It is interesting to trace the history of a plant like this, as a botanist might be excused for recording it without question as indigenous to Norfolk Island.

URTICEÆ.

FICUS COLUMNARIS.—The Banyan from Lord Howe Island.

FICUS MACROPHYLLA, Desf.—"Moreton Bay Fig."

CASUARINEÆ.

CASUARINA GLAUCA, Sieb. (?), determined in absence of fruits. This is a planted species found in several parts of the Island (*e.g.*, Orange Vale and Mr. Fletcher Nobbs' property) where it goes under the absurd name of "Scotch Fir."

Introduced Plants.

List B.—Miscellaneous Plants of Economic and Horticultural Value.

Some of the islanders are very fond of flower gardens, and have a veritable blaze of flowers. At the same time, with the conditions so favourable, the flower gardens ought to be greater in number. Many of the ordinary herbaceous plants found in Sydney gardens are to be seen on Norfolk Island. Following are some miscellaneous trees, shrubs and miscellaneous plants, not pre-

vously enumerated, observed by me. They are chiefly of an ornamental character :—

Trees.

English Oak.

Pepper-tree (*Schinus molle*).

Cupressus macrocarpa.

Weeping Willows.

Salisburia adiantifolia (Maidenhair Tree).

Robinia pseud-Acacia

Yucca aloifolia.

Agave americana (American Aloe).

Fourcroya gigantea (Mauritius Hemp).

Arum Lily (*Richardia*), here known as Water Lily.

Strelitzia Nicolai.

Lilium Harrisii longiflora (White Lily, which does remarkably well all over the island).

Alstrœmeria peregrina in gardens, and also an escape.

Bambusa arundinacea (Large Bamboo) forming some noble clumps.

Ficus repens (Creeping Fig), on the Patteson Memorial Church. It would add much to the picturesqueness of the buildings if this Fig were very freely planted.

Hedge-plants.

Duranta stenophylla, the only *Duranta* in the Island, makes a splendid hedge, and is often used for that purpose. A similar observation may be made in regard to *Tecoma capensis*, which is very abundant.

Miscellaneous shrubs.

Datura suaveolens (Trumpet flower), which grows wild.

Begonia semperflorens. Huge plant six (6) feet through and the same across, a very blaze of flowers. I am told it is always in flower and it is a sight to remember.

China Rose ("Lady Brisbane") in great profusion and sometimes wild.

Oleander, in great profusion, and even wild.

Periwinkle, wild.

Fatsia papyrifera (Chinese rice-paper plant) grows wild in the Mission ground.

Myrtle (*Myrtus communis*).

Rhododendron ponticum (a common sort).

Ligustrum japonicum.

Crotons.

Jasminum Sambac.

Francisera.

Nandina domestica.

Hibiscus sinensis.

Some other plants are referred to below in botanical sequence.

Cereals and other Grasses.

Maize.—This is, of course, one of the first crops ever grown on the Island. I was informed that four sorts are principally cultivated, viz. :—

(1). Ninety-day.

(2). Red (the sort commonly grown in the Island).

(3). White.

(4). Red and white, with large flat grain.

A little Sweet Corn and Pop Corn are also grown.

I did not see a cob of any of the sorts, except No. 3, and, owing to the drought, which continued at the time of my visit, the maize was in such a backward condition that I could form no opinion as to the crops. I was informed that the Department of Agriculture had sent about 20 sorts of maize to the Island last year for experiment, but all that I could ascertain from the people was "Some did well and some did not." This little incident tends to show that it is of little use conducting experiments except under the auspices of some responsible official—say a gardener in charge of a small experimental area. Maize is cultivated by most householders; it is used for fowl-feed, but very rarely for horses. The horses are chiefly grass-fed, and most of them do not know the taste of corn and will not eat it.

A little pop corn is utilised, and some sweet corn is used as a vegetable. The white corn, ground, mixed with a little flour and milk into a "corn cake," is often used as an article of food.

I could obtain no figures as to the yield of maize on the Island. None is exported at present. The Island could produce a vast amount of corn if required, but it must be borne in mind that the New Hebrides and other islands can also grow corn even more readily and compete with New South Wales in the Sydney market in regard to this commodity.

Wheat.—The first record of the cultivation of wheat is Lieut.-Govr. King's statement, on 3rd June, 1788, "Began breaking up part of the ground on the N.E. side of the hill to sow wheat."

As the settlement progressed wheat and maize were stored for the use of the settlement, and also sent to Port Jackson.

On the hill, at the back of the Church of England, are nine (9) very large brick silos, locally known as "Mummies," with a deep protecting drain. These were used for the storage of grain, and it would be interesting to know when they were constructed. I have a note, "On 8th June, 1839, the silos at the back of the Commissariat store were filled with maize and sealed."

The following hitherto unpublished table shows the return of white crops for the twelve (12) years ending 1843:—

YEAR.	MAIZE.		WHEAT.		RYE.		BARLEY		OATS.	
	No. of Acres.	No. of Bushels	No. of Acres.	No. of Bushels	No. of Acres.	No. of Bushels	No. of Acres.	No. of Bushels	No. of Acres.	No. of Bushels
1832	226	2889	100	396	...	...	..	...	...	...
1833	140	2950	32	496	...	..	...	...	...	...
1834	275	3927	97	1053	...	...	...	...	...	...
1835	398	4690	130	1580	...	...	...	...	...	...
1836	386	15914	141	4495	6	194	...	...	...	...
1837	506	20935	200	398	10	284	...	...	...	...
1838	735	21245	231	2235	21	500	24	764	...	...
1839	818	26882	206	1487	43	244	79	1435	...	...
1840	805	27078	237	3442	14	84	50	900	15	354
1841	815	21596	275	1400	8	91	59	1005	31	994
1842	619	7625	303	2424	7	188	28	288	24	960
1843	615	8379	34	546	58	1456	56	1645	25	750

Wheat is no longer a crop. Buckwheat and White Clover are on the Island. I saw a little Lucerne, but it does not appear to be cultivated now.

Miscellaneous Grasses.

Paspalum dilatatum, Poir., introduced by Colonel Spalding.

Stenotaphrum americanum, Schrank, the common Buffalo Grass of Australia, but not of America.

Sorghum halepense, Pers. (Syn. *Trachypogon avenaceus*, Nees, Endl., Prod. Norf. 55). Hay grass of the Island.

Phalaris canariensis, Linn. "Canary Grass."

Ammophila arundinacea, Host. (*Psamma arenaria*, Rœm. & Schult.). The Marram Grass, planted at Emily Bay.

Dactylis glomerata, Linn. "Cocksfoot."

Bromus arenarius, Labill. (?) No specimens brought.

Bromus unioloides, H. B. and K. (*Ceratochloa unioloides*, DC.).

Lolium perenne, Linn. "Rye Grass."

Couch (*Cynodon dactylon*) is the common pasture grass of the Island. Evidence of its value as fodder is the fact that the stock rarely feed on anything else, and look well on it.

Buffalo Grass (*Stenotaphrum americanum*) is now common on the grassy hills adjacent to the Cascades, and is spreading over the Island, having been deliberately planted by the people. With us it is looked upon as of little value, as stock rarely eat it, and thus it encroaches on the more valuable Couch. In Government House Grounds, Sydney, for example, the State has been to very considerable expense in eradicating Buffalo Grass, as stock will not touch it, and it threatened to destroy the fine grass in the paddocks. I would, therefore, urge on the Islanders the very great desirability of not further planting Buffalo Grass until it has been proved that it is nutritious, and that it is readily eaten by stock. I am quite aware that it is possible for a grass to be a pest in the pasture in New South Wales and a valuable fodder plant in Norfolk Island, but the onus of proof rests with those who propagate it. Of course it is a valuable sand and earth binder, and hence is useful for the construction of banks, etc., by engineers.

The Marram Grass, planted in the vicinity of Emily Bay a few years ago, is flourishing, and no doubt will in time prove a valuable

sandstay. But the fences are down in some places, and horses and cattle get in and damage it, so that it does not have perfectly fair play.

I am not aware that grasses (except a little Barley and Oats for hay at the Melanesian Mission) are now artificially sown, or that ensilage is made of any forage plants.

ROOT CROPS.

Yams are cultivated to some extent by the Islanders, but on a much greater scale by the Melanesian Mission. By the former they are used as a vegetable, like potatoes. Lieut.-Govr. King speaks (under date 19th April, 1788) of "the yams now thriving very well."

Sweet Potato.—Backhouse (p. 260) speaks of the abundant use of the Sweet Potato in his time. He says "they are excellent for food, either roasted, boiled, or fried in slices. When prepared by frying, this root resembles sweetish cake, and sometimes supplies the place of toast at breakfast."

Downing (who copied a good deal from Backhouse) calls it the Sweet Potato or "Buck," a term not in use on the Island at the present day. It is universally known as Kumara (pro. Koomara), which is the Tahitian and Maori name. The Islanders grow them in very large quantities, and at the Melanesian Mission they form such an important part of the diet of the natives that their cultivation and consumption may be fitly termed enormous. The kinds chiefly grown at present are the Tongan, Portuguese and Sunday Island, but additional and improved varieties are much required.

Arrowroot.—Downing wrote in 1851:—"The Arrowroot is very extensively and successfully cultivated in Norfolk Island. The starch is separated in the usual manner, in the months of September and October, and is found to be of superior quality." The plant yielding it is a Maranta, and it was supplied from the West Indies by Government, through the Sydney Botanic Gardens, many years ago. Very little is now made, and only for private use. It is of good quality. I brought some to Sydney and sub-

jected it to practical test. On enquiring why the industry was dying out, I was told, "It's too hard work." It seems a pity that a useful minor industry like this should die out. The people are acquainted with the technique of the manufacture, and I see no reason why, providing there is no tariff difficulty in the way, the Norfolkers should not have a fair share of the Sydney market for their product.

Potato.—Downing wrote in 1851 :—"The common or round potato is cultivated, but not with success, although four crops are produced yearly from the same soil. There is a great tendency to run to stalk, from the rapidity of growth, and the tubers are generally small and watery." I tasted some very good potatoes, although there is a tendency towards too much planting on the same soil, and too little change of seed.

FRUITS.

Banana.—On 18th October, 1796, Lieut.-Govr. King reported :—"The bananas *found on the island* and those brought from the Brazils grew to a very great perfection, the bunches weighing from 40 to 80 lb. each."

Collins (2nd ed. 149) states that King was of opinion that the Island had contained aboriginal inhabitants "from discovering the banana tree growing in regular rows." But see my remarks under *Colocasia*, p. 723. Endlicher, *Prod. Norf.* 75, admits *Musa paradisiaca*, Linn., into the flora on this evidence. He quotes Collins (2nd ed. 311), but I cannot find the reference, and Hunter (p. 290) (I note Hunter, pp. 306 and 308), but perhaps in a German edition, and there is no reference at this page of the English edition. I am of opinion that the Banana was not found on the Island prior to the advent of the white man, and that the record has arisen through some confusion with a note of King's (see p. 723). At the same time King's remark above, in italics, is very definite. Bananas have long been a staple article of food of the people, and I feel sure that the small export trade in this commodity could be very largely developed. They are eaten at every meal, and are largely used as a vegetable.

There are, of course, many kinds of Bananas, and the shortness of my stay prevented my making careful enquiry into the names and merits of the various kinds. The following sorts are recognised, and I will endeavour to make the list complete at some future time:—

1. China (Cavendish).
2. Sydney (so called because it came from Sydney Botanic Gardens). (*Musa sapientium*). It is very much esteemed. Best for eating.
3. Pear (flavour of pear, from Fiji).
4. "Japanese." Very large bunches. (Also known as Dr. Codrington's).
5. Pitcairn, or "Home" (the most esteemed banana by some people).
6. Plantain (*M. paradisiaca*).
7. "Putter," from the name of the person who brought it from Lifu.

Apples.—On 18th October, 1796, Lieut.-Govr. King reported: "The apple trees brought from the Cape in 1791 have born very fine fruit." Apples do not, however, do well. Nor do pears; only one kind of pear (the Chinese Pear) does fairly well.

Peaches are poor. Nectarines have nearly died out. There will always be hindrance to development of the cultivation of such plants until such time as the Islanders know how to graft fruit trees.

Apricots rarely, if ever, bear. Perhaps the climate is too hot.

I saw no Almonds. If this tree has not been tried it ought to be.

There is an inferior kind of Quince.

The Loquat is almost a weed, but the large-fruited sort is a desideratum.

Grape-vine.—Norfolk Island is not adapted to the cultivation of the vine. It simply runs wild, and produces small grapes. The Isabella Grape, however, flourishes, and is free from disease.

Guavas.—Lieut.-Govr. King wrote on 18th October, 1796, that there was a great abundance of Guavas. Backhouse (p. 274)

wrote:—"Guavas are now ripe; they are so abundant on various parts of the Island that the supply is more than sufficient for man, pigs and birds, all of which consume great quantities of them."

At the present time guavas constitute one of the most formidable weeds on the Island. There are small forests of them, in many cases over-running good land, to the detriment of the cultivator. It is the ordinary Yellow Guava which is in such profusion, and it yields two crops a year. In addition the "Blue Guava" (*Psidium Cattleianum*) is common. There are also a few trees of Parker's Hybrid, which were introduced by Dr. Metcalfe.

Citrus fruits (Lemon).—Of this fruit there was "a great abundance" as early as 18th October, 1796, according to Lieut.-Govr. King. It is now one of the principal weeds of the Island, utilising good land, of course. Its spread is owing to the combined action of birds and stock. In places its thorns present a formidable barrier to a passage through the bush. Most of the lemons are thick-skinned, and would be of very little value. But a matter for consideration by the officer in charge of an experimental farm would be to ascertain if these lemons, whose only cost is that of gathering, could be used for the manufacture of citric acid.

The stock is obviously most vigorous, and one of the first functions of a gardener in charge of an experimental farm would be to show the Islanders how to bud and graft Lisbon and other lemons on the common stock.

I saw Lisbon lemons in very few properties. Col. Spalding has two hundred which have only been planted two (2) years. They are 8 ft. high, and have already cropped.

That there is money for Norfolk Island in the lemon industry I am quite sure. Lisbon lemons should be grown, and they should be carefully graded and packed.

Citrus fruits (Orange).—These useful trees grow wonderfully well. Many of the trees are, in fact, growing wild. They are almost entirely free from scale. But there is practically no

market for them, and hence no special inducement to the Islanders to cultivate. A consignment is eaten up with expenses in the Sydney market, while the arrangements for conveying fruit in the steamers are very defective, and entail great loss on the growers. Surely improvements are to be looked for both in regard to the carriage of the fruit and in regard to the marketing in Sydney. The quality of most of the fruits is simply delicious. I shall ever retain pleasant recollections of Norfolk Island Oranges.

The Mandarins grow in great profusion, and colour marvellously well. The quality of the fruit is good, but not so good as that of the ordinary oranges.

There are a few Citrons and Shaddocks, while at the Mission Station are some Limes. The Lime is a very old introduction. Lieut.-Govr. King records, under date 3rd June, 1788, that he brought it with him at the settlement of the Colony.

Olive.—I saw a tree 5 feet through at the base. The Wild Olive is abundant, and there can be no doubt that the Olive thrives in the Island. But I saw no good sorts, and it would be desirable to introduce the best varieties. The gathering of olives (a tedious process, yet light work, suited for women and children), the pickling of them or the expression of oil, seem to me suitable employment for the inhabitants of Norfolk Island.

Strawberries.—Considering the latitude of Norfolk Island, the strawberry crops were a revelation to me; and their success is of course to be attributed to the rich, stiff basaltic soil. What I chiefly saw were a round fruit (? Keen's Seedling) and a pointed one (? Marguerite). They were growing in great profusion, and I feasted upon them every day. The quality was excellent, and I could see no trace of disease on the plants. Yet on enquiry I find that few families took the trouble to grow this most delicious fruit.

Miscellaneous.—The Passion Vine (*Passiflora edulis*) grows freely, and is, indeed, wild in the bush.

Monstera deliciosa. Mr. Isaac Robinson has a plant or two.

Spanish or Sweet Chestnut (*Castanea vesca*). This does not bear well, although it forms a handsome tree.

Mulberry (*Morus nigra*) does well.

Walnut (*Juglans regia*) scarcely fruits.

The Cherimoyer grows well in Capt. Bates' garden, and this delicious fruit is occasionally consigned to Sydney.

The Mango appears to do fairly well. This valuable fruit tree should be well tested, the best varieties alone being planted.

The Cape Gooseberry (*Physalis peruviana*, Linn.) is very plentiful.

“Many of the old roads, formerly used for bringing timber out of the woods, are grown up with Cape Gooseberry, *Physalis edulis*, which produces abundance of pleasant, small, round fruit, in a bladder-like calyx. This is eaten by the prisoners” (Backhouse, 264).

The Rose Apple (*Eugenia jambolana*) is thoroughly at home on the Island.

Captain Bates has a few tree-tomatoes (*Cyphomandra betacea*) which bear fruit in profusion.

The Date-palm does not appear to have been fruited on the Island.

The Coconut also flowers, but does not fruit.

The Pomegranate grows well.

The Date Plum succeeds fairly well.

SUGAR-CANE, COTTON, COFFEE.

Sugar-cane.—When Lieut. Govr. King reported on 18th October, 1796, this plant must have been well established on the Island. He introduced it at his first planting in March, 1788. He wrote :—

“The Sugar-cane of which the different inclosures are made is extremely luxuriant and grows to the greatest perfection. Some sugar and a small quantity of spirits has been made. It is to the great quantity of sugar-cane that I attribute the success the inhabitants have met with in rearing such a number of swine.”

Backhouse, p. 268, wrote :—

“From the sugar-cane, the old settlers of Norfolk Island succeeded in making molasses, but they failed in obtaining sugar, not being aware that the addition of a little lime, or potash, was needful to make it crystallize. They also distilled rum, and injured themselves greatly by drinking it.”

Downing, nearly twenty (20) years later, said :—

“The sugar-cane is seen in many places growing luxuriantly, but quite neglected. The first settlers introduced the plant, and made rum of its juice. Under the subsequent regime this distillation was forbidden, and hence the cane became valueless.”

The Sugar-cane is now only to be seen growing in a few places, being simply used for eating. It is certainly not a robust variety, and I know nothing of its quality. I do not suppose that Norfolk Island could compete with Fiji and the islands of many of the other groups in sugar growing.

Cotton.—I saw no Cotton, though this plant would flourish on the Island. The gathering of the crop might suit the temperament of the easy going inhabitants. If Cotton were re-introduced it should be under expert advice. Information would doubtless be forthcoming from the Colonial Office which is at present developing the Cotton crops of West Africa under the guidance of American experts. Lieut. Govr. King sowed three (3) cotton seeds in 1788, and under date 18th Oct., 1796, he reported :—
“Cotton has also done well, although but little of it has been cultivated, as I am told it is a bad kind.”

Downing wrote in 1851 :—

“The Cotton-plant was once cultivated by Captain Maconochie with advantage. It is now wild, and overruns every part of the island to such an extent as to render the bush almost impracticable.”

I think, however, this statement is overdrawn.

A statement (manuscript) made about 1843 says :—

“The soil and climate of Norfolk Island are also adapted to the cultivation of Cotton (*Gossypium barbadense*), perhaps more so than any other, and as the labor attending it would be considerably less than that of maize, and the crop much more profitable, it is to be regretted that it has not been tried on a large scale. The produce of two rods, planted by Captain Maconochie on

the W. side of his garden at Cascade, was immense, and of the very finest texture and quality."

Coffee.—On 18th October, 1796, Lieut. Govr. King wrote:—

"Two weak coffee-trees, brought in 1791, are now healthy trees, bearing upwards of 20 lb. of berries each; from the luxuriance of their growth, great quantities might easily be raised."

Such was the beginning of Coffee in Norfolk Island.

If the Historical Records of N.S.W. be searched (*e.g.* vii. 7, *et ante*) it will be observed how again and again the authorities insisted on the prospective value of the Coffee plant to Norfolk Island. And in the partial evacuation of the Island in 1809 (vii. 273), talked of since 1803, Coffee was the only plant on Norfolk Island that appeared to concern the authorities.

A cultivated specimen (in flower and fruit) of *Coffea arabica* was depicted as tab. 91 of Ferd. Bauer's drawings of Norfolk Island plants. This useful plant was in the year 1819 taken to Tahiti from Norfolk Island according to Ellis (*Polynesian Researches*, i. 464, not 164 as stated, *Endl.*, *Prod.* p. 61).

In 1835 Backhouse (p. 278) wrote: "I had also a letter from Alexander McLeay, informing us that the 'Friendship' would call here, for Coffee plants, on her way to Tahiti."

In 1851 Downing says, "The Coffee-plant thrives well and yields berries of small size and good flavour."

Captain Bates, a very old settler, has a large number of Coffee-trees in full bearing. Their growth is such that one cannot doubt for a moment that the climate and soil of Norfolk Island are very favourable to the development of this plant.

But it has been reserved to Colonel Spalding in late years to attempt to develop Coffee-growing into an industry. He commenced to plant in June, 1897, and last year cleaned half a ton of coffee; this season he anticipates a yield of three (3) times as much. He has 12,000 trees in various stages of growth, and the labour he has expended on his plantation may be fitly described as enormous. He has not only worked hard, but has carefully acquainted himself with the literature of the industry, and has also devised a number of ingenious mechanical contrivances for pulping,

&c. Col. Spalding spaced his trees 6 ft. \times 6 ft. and latterly 6 ft. \times 7 ft., allowing the extra 1 ft. for traffic. He has dwarfed his trees by heading them back; this affords the very great advantage of enabling the gathering of the crop to be carried out without the use of ladders, &c. He has good authority for the spacing of his trees as he has done; at the same time, without presuming to be a coffee planter, it seems to me that too close planting involves the risk of exhausting the soil and hence of opening the way to disease. However, the soil of Col. Spalding's plantation is marvellously rich, and I could see no trace of disease.

Minor Economic Plants.

Hovenia dulcis, "The Raisin Tree" (Rhamnæ). I saw one specimen.

Leucaena glauca, Benth. (Leguminosæ) is grown.

Inocarpus edulis (Leguminosæ). The "Vi" tree. There is a specimen from the Solomon Islands in the Melanesian Mission grounds.

Dolichos Lablab, Linn.; the well-known bean, often used for food.

Caesalpinia coriaria, Roxb. "Divi Divi," the celebrated tanning plant. The pods are used.

Indigofera Anil, Linn. This is a native of Tropical America. I found a few plants at Orange Vale, probably a remnant of an old experiment. It is cultivated in India as a source of Indigo, together with the better known *I. tinctoria* (Watt, Dict. Econ. Prod. India, iv. 383). The two species are closely allied. The pod of *I. tinctoria* is "nearly straight," and that of *I. Anil* is "sickle-shaped." See DC., Prod. ii. 225; Hook., Fl. Brit. Ind. ii. 99.

The Chocho (*Sechium edule*) flourishes well, and would grow out of bounds if permitted.

Downing wrote, "Cayenne pepper, manufactured from the pods of the Capsicum grown in these gardens, has a quality and flavour equal to any that can be obtained. It is in much demand." It is but little grown at the present time.

Nicotiana Tabacum. The Tobacco seems quite at home. Peppermint is plentiful in some watercourses and damp grounds.

Tragopogon porrifolius (Salsify) is wild, and so is

Fœniculum vulgare (Fennel).

The Celery plant also is wild. Watercress is plentiful.

Introduced Plants.

List C.—Plants introduced for Cultivation, and which have got more or less beyond control.

CRUCIFERÆ.

Matthiola incana, R.Br. (?). The common Purple Stock has abundantly run wild near Emily Bay.

GERANIACEÆ.

Oxalis reptans, Sol., Endl., Prod. Norf. 128.

LEGUMINOSÆ.

Cytisus sp. Introduced as a hedge at the Melanesian Mission.

Lupinus sp. A purple-flowered species in Edward Buffett's paddock, and also in the Mission ground. The amount of seed is wonderful.

Vicia sativa, Linn. I have seen a specimen from the Island labelled *V. sepium*, Linn., which is, in my opinion, also *V. sativa*, Linn.

Vicia hirsuta, Koch.

CACTEÆ.

Opuntia brasiliensis, "A Prickly Pear" (bright yellow flowers, thin joints, two-spined). In Mr. Rossiter's land and at the Mission, near the gate. A plant near a building near the pier. I was told that the people have often tried to exterminate the Prickly Pear by cutting it and throwing it into the sea, but fail to exterminate it. They might be instructed how to exterminate it by means of a solution of arsenic in soda. I did not see much of the weed, and it could be got rid of readily enough.

LABIATÆ.

Salvia pseudococcinea, Jacq., Ic. Pl. Rar. t. 209, determined through the kindness of Kew. Wild and a great pest.

Mentha viridis, "Garden Mint," and *Mentha piperita*, "Peppermint," are both abundantly acclimatised.

AMARYLLIDÆ.

Alstrœmeria (?) *pulchella*. Escaped from cultivation.

PONTEDERIACEÆ.

Eichhornia (*Pontederia*) *crassipes*, near Bloody Bridge. Introduced by Dr. Metcalfe, and not likely to be a nuisance.

Introduced Plants.

List D.—Weeds accidentally introduced.

PAPAVERACEÆ.

Argemone mexicana, Linn.

Fumaria officinalis, Linn.

CRUCIFERÆ.

Senebiera didyma, Pers.

Sisymbrium officinale, Scop.

CARYOPHYLLÆ.

Cerastium vulgatum, Linn.

Silene gallica, Linn.

Polycarpon tetraphyllum, Loeffl.

MALVACEÆ.

Malva rotundifolia, Linn., Endl., Prod. Norf. 136.

Sida rhombifolia, Linn. It is known on the Island as "Big Jack," after a Pitcairner of that name, who recommended it to feed goats and pigs.

LINEÆ.

Linum gallicum, Linn.

GERANIACEÆ.

Oxalis corniculata, Linn.

Erodium moschatum, Linn.

LEGUMINOSÆ.

Medicago denticulata, Willd.

Melilotus alba, Linn.

Trifolium minus, Sm.

Cassia larvigata, Willd. Known as "Acacia"; a very bad weed. It will die if eradicated, and the seed does not readily germinate.

ONAGRARIÆ.

Oenothera biennis, Linn.

„ *tetraptera*, Cav. (?)

UMBELLIFERÆ.

Caucalis nodosa, Scop.

RUBIACEÆ.

Sherardia arvensis, DC.

COMPOSITÆ.

Ageratum conyzoides, Linn. Has the absurd name "Nightshade" on the Island. Widely distributed over the South Sea Islands.

Erigeron linifolius, Willd.

Siegesbeckia orientalis, Linn.

Galinsoga parviflora, Cav.

Hypochaeris glabra, Linn.

„ *radicata*, Linn.

Taraxacum dens-leonis, Desf.

Centaurea melitensis, Linn.

PRIMULACEÆ.

Anagallis arvensis, Linn.

ASCLEPIADEÆ.

Asclepias physocarpa (E. Mey.), Schl. My plant, the common "Cape Cotton" of Australia, and universally hitherto (I think)

known by Australian botanists as *Gomphocarpus fruticosus*, R.Br., was determined by Rudolph Schlechter, when in Sydney, as above.

According to Schumann (Nat. Pfl. Fam.), the genera *Gomphocarpus* and *Asclepias* are quite distinct. I cannot find that *Asclepias physocarpa* was published, but we have *Gomophocarpus physocarpus*, E. Mey. Mr. Schlechter doubted that our Australian *G. fruticosus* is correctly determined, and the S. African specimen in the Herbarium has much smaller fruits.

Schumann says:—“*G. fruticosus*, (Linn.) R.Br., is spread over nearly all the warmer parts of the globe, doubtless everywhere introduced. It is a very variable plant, and also that *G. physocarpus*, E. Mey., differs from it only by the inflated fruits. There seems to be a difference of opinion between Schlechter and Schumann. Schlechter probably considers *G. fruticosus* and *physocarpus* to be distinct species, and Schumann as forms. There seems to be no doubt that our introduced plant is *not the true G. fruticosus*, and should be called either *G. fruticosus*, R.Br. var. *physocarpus*, or *G. physocarpus*, E. Mey.

SOLANACEÆ.

Solanum sodomæum, Linn. Known as “Poison” by the islanders. This is one of the worst pests on the Island, and it is very difficult to exterminate, since every bit roots. If an ordinance were passed compelling every landowner to keep his land clear much good would be done, and the Government would do something, of course, to keep Crown lands clear, but the effort would be worth making.

Solanum auriculatum, Ait. Universally known as “Tobacco” on the Island. This tall weed grows in incredible profusion and to a large size. I saw one 20 feet high and another with a head 25 feet in diameter. The circumference of the stem is sometimes considerable. Mrs. Bates told me of one she had measured which was no less than 44 inches, but I did not see any so large. It is, however, a weed which has some redeeming points:—

1. It is useful for firewood, and hence it might be judiciously checked. If it were entirely exterminated the islanders would have to fall back on the indigenous trees for firewood, and this would be regrettable.

2. It is a breakwind.

3. It produces much humus from its fallen leaves, and worn-out land is improved by allowing it to lie fallow with a growth of "Tobacco."

4. The Islanders make jam of the fruits.

5. Mrs. Spalding told me that the Norfolk girls use it as a scrubbing agent (with a little soap) for floors, tin-ware, pots, &c.

Nicandra physaloides, Gaertn.

Datura stramonium, known on the Island as "Cranky."

SCROPHULARINEÆ.

Verbascum Thapsus, Linn. "Shepherd's Blanket" of the Islanders. On the (now) grassy top of Mt. Pitt and other places.

VERBENACEÆ.

Lantana Camara, Linn. The islanders made a law against *Lantana*, but it has fallen into neglect.

Verbena bonariensis, Linn.

LABIATÆ.

Salvia verbenacea, Linn.

Salvia pseudococcinea, Jacq.

Marrubium vulgare, Linn. "Horehound."

Stachys arvensis, Linn. The common weed known as "Stagger Weed" on the mainland.

PLANTAGINEÆ.

Plantago lanceolata, Linn.; *P. major*, Linn.

AMARANTACEÆ.

Amarantus viridis, Linn. (?). In bud only.

CHENOPODIACEÆ.

- Chenopodium murale*, Linn.
 „ *ambrosioides*, Linn.

PHYTOLACCACEÆ.

- Phytolacca octandra*, Linn. “Poke-weed.”

POLYGONACEÆ.

- Polygonum minus*, Hudson.

EUPHORBIACEÆ.

- Euphorbia Peplus*, Linn.
Ricinus communis, Linn. “Castor-oil plant.”

URTICEÆ.

- Urtica urens*, Linn. “A nettle.”

IRIDEÆ.

- Sisyrinchium micranthum*, Cav.

LILIACEÆ.

- Allium fragrans*. Introduced with plants sent from Sydney.

GRAMINEÆ.

- Briza minor*, Linn.
 „ *maxima*, Linn.
Poa annua, Linn.
Festuca bromoides, Linn.
Bromus sterilis, Linn.

Norfolk Island for many years employed over a thousand men in agricultural pursuits. These were succeeded (from Pitcairn) by 30 or 40 free men who simply could not keep in order the land that had been already cleared and broken up. There are at the present time only about a hundred working men on the Island, and they cannot be expected to keep the land as free from weeds as it undoubtedly was in convict times. When land is broken up for cultivation and then neglected, it is surprising how abundantly weeds take possession of it.

When ground on the Island is ploughed, the Cape Gooseberry (*Physalis peruviana*) first comes up abundantly, and this is succeeded by the Castor-oil plant. But these are not the worst weeds. The four following weeds occur in incredible profusion, and I may say that never in the whole course of my experience have I come across such a place for weeds as Norfolk Island. It affords a striking and sad example of the way in which an interesting endemic vegetation is becoming overwhelmed with introduced plants. The four principal weeds alluded to are :—

1. Tobacco (*Solanum auriculatum*).
2. Poison (*Solanum sodomæum*).
3. Acacia (*Cassia levigata*).
4. Red Salvia (*Salvia pseudococcinea*).

Making every allowance for the islanders, I still feel that they do not make adequate efforts to keep the weeds in check. From all that I could gather, the islanders are something of fatalists in the matter of weeds. Even the cemetery at Emily Bay is overgrown in the rankest manner. There are weeds from the sea-level to the very summit of Mt. Pitt. In many cases they should be mown down persistently with a scythe, while in a flowering state; they should not be allowed to seed; then they should be ploughed in and sown with grasses. A few years of intelligently directed energy would make a marvellous difference in the stock-carrying capacity of the land and in its general appearance.

The rolling downs of the Island are park-like and marvellously beautiful, but they are marred by weeds. Still the beautiful appearance of well weeded park-land may be seen in part of the Mission Station, where, of course, there is much more labour available than in most parts of the Island.

As regards *Salvia pseudococcinea* (see p. 763), we have an object-lesson which the islanders would do well to ponder. If a plant once gets the upper hand, it may become a serious weed. Therefore, watch garden-escapes. Watch the plants which come up with a crop, the result of dirty seed. No amount of foresight can prevent these escapes showing themselves, but ordinary foresight can prevent their becoming a pest. Tobacco was doubtless

originally introduced to beautify a home. Setting aside the weeds that have made most headway, by all means give attention to those plants that seem to be getting out of hand—incipient pests.

I understand that the eradication of weeds was at one time enumerated amongst the public works. But, as far as I can ascertain, very little weed-eradication is undertaken on either public or private account. The reason is that the people have so much land that at present they do not feel the deprivation of those areas which are lost to them through being rendered useless with weeds. But sooner or later, even in Norfolk Island, the pinch will come, and I think it should be impressed on the people that weeds, if allowed to seed, are spread through the agency of the wind, birds and stock. Something should be done, if only to prevent the weeds getting worse. The so-called "Poison" (*Solanum sodomæum*) is difficult to cope with. It bears enormous quantities of fruit, full of seed; and it should be eradicated and burnt. The so-called Tobacco (*Solanum auriculatum*) has some redeeming features, as already pointed out. The fruit of the Tobacco is palatable to birds, which drop the seeds everywhere, and it has taken on such an aggressive attitude that it is ousting the indigenous vegetation. Let the islanders by all means use it for fuel, but endeavours should be made to keep it in fuel reserves and not allow it to spread, unchecked, all over the Island. The best way to cope with these two weeds is to hoe or mattock them out when in flower. While I think the public spirit of the islanders should rouse them to do more weeding than they do, if only to improve the appearance of their beautiful island, I am of opinion that the weed-pests will only be adequately dealt with when there is a large accession of population.

PESTS.—I made enquiry, as far as my opportunities permitted me, in regard to the insect and fungus pests on the vegetation. Norfolk Island does not appear to be cursed with very serious pests; at the same time some of them entail some loss on the Islanders, and, as years roll on, they will probably visit the crops

with increasing severity unless approved means for combating them are seriously studied and adopted.

Reference to the original report of Lieut. Governor King in 1788 onward (see Hist. Rec. N.S. Wales, Vol. ii) shows how at the very beginning of settlement he was troubled with pests.

The American Potato Blight (*Botrytis infestans*) is said to be a recent pest, but it is already prevalent. The haulm withers right down in a day, and the potato is found to be spotted and then rotten. The Islanders are in the habit of saving their own seed and planting the same patch year after year. The remedies are fresh seed and fresh ground.

I noticed Mealy Bug on Oranges and Lemons, and Black Scale on Lisbon Lemons.

Curl-leaf was observed on some Peach trees.

Maize occasionally suffers from rust.

Onions are liable to rust, and also to the attacks of a scale insect.

Water-melons, &c., are liable to attacks by aphids.

Imported snails are very destructive.

Viscum articulatum, a native Mistletoe, is very destructive to Peaches, Oranges, and some other trees. The branch should be cut out between the end of its parasitic roots and the stem of the tree. The Islanders do not, however, appear to take any steps to check it.

On the other hand, the Coffee-plant is free from disease. There are no snakes, leeches or ticks. White ants are absent, and mosquitoes are very rare.

SUMMARY OF RESULTS.

ADDITIONS TO THE INDIGENOUS FLORA.

Norfolk Island presents few physical difficulties to the botanical explorer. The following appear to me to be new records for the Island; it does not include one species new to science.

PHANEROGAMS (46).

- Clematis glycinoides*, DC.
Ranunculus parviflorus, Linn.
Cakile maritima, Scop.
Frankenia pauciflora, DC.
Malvastrum tricuspidatum, A. Gray.
Linum marginale, A. DC.
Pelargonium australe, Willd.
Geranium dissectum, Linn.
Glycine tabacina, Benth.
Rhodomyrtus psidioides, Benth.
Lythrum hyssopifolium, Linn.
Mesembryanthemum æquilaterale, Haw.
Apium leptophyllum, F.v.M.
Vernonia cinerea, Less.
Bidens pilosa, Linn.
Cotula australis, Hook. f.
Senecio lautus, Forst.
Sonchus oleraceus, Linn.
Picris hieracioides, Linn.
Wahlenbergia gracilis, A. DC.
Erythraea australis, R.Br.
Ipomœa Pes-Caprae, Roth.
Veronica calycina, R.Br.
Verbena officinalis, Linn.
Rumex Brownii, Campd.
Oberonia palmicola, F.v.M.
Microtis porrifolia, R.Br.
Colocasia antiquorum, Schott.
Cyperus rotundus, Linn.
Cyperus congestus, Vahl.
Kyllingia monocephala, Rottb.
Heleocharis acuta, R.Br.
Scirpus lacustris, Linn.
Scirpus riparius, Spreng.

- Scirpus maritimus*, Linn.
Carex inversa, R.Br.
Panicum effusum, R.Br.
Panicum sanguinale, Linn. var. *ciliatum*.
Paspalum scrobiculatum, Linn.
Andropogon refractus, R.Br.
Andropogon affinis, R.Br.
Microstachya stipoides, R.Br.
Echinopogon ovatus, Beauv.
Deyeuxia Forsteri, Kunth.
Dichelachne crinita, Hook. f.
Cynodon dactylon, Linn.

CRYPTOGRAMS (17).

- Polypodium confluens*, R.Br.
Adiantum diaphanum, Blume.
Pteris quadriaurita, Retz.
Blechnum discolorum, Forst.
Athyrium brevisorum, Wall.
Aspidium decompositum, Spreng.
Leptogium tremelloides, Linn.
Physma byrsinum, Ach.
Usnea barbata, Ach., and var. *florida*, Fr.
Ramalina leiodea, Nyl. var. *fastigiata*, Muell. Arg.
Ramalina farinacea, Linn.
Thelochistes flavicans, Sw.
Physcia confluens, Mtn.
Pyxine cocoes, Sw.
Patellaria versicolor, Fée.
Glyphis verrucosa, C. Kn.
Lentinus exilis.

The Algae (new records) obtained on the shores of the Island I will not enumerate at this place.

2. The following list of species includes doubtful records and some plants worthy of further inquiry for various reasons:—

DOUBTFUL RECORDS AND SPECIES INQUIRENDE.

- Clematis indivisa*, Willd.
Clematis cocculifolia, A. Cunn.
Drimys Howeana, F.v.M.
Capparis nobilis, F.v.M.
Hymenanthera dentata, R.Br. (*H. oblongifolia*, A. Cunn.).
Boronia Barkeriana, F.v.M.
Eriostemon ambiens, F.v.M.
Eriostemon Beckleri, F.v.M.
Bosistoa euodiformis, F.v.M.
Pennantia Endlicheri, Reiss.
Streblorrhiza speciosa, Endl.
Metrosideros polymorpha, Gaud.
Mesembryanthemum australe, Sol.
Olea paniculata, R.Br.
Ochrosia elliptica, Labill.
Tylophora enervia, F.v.M.
Smilax purpurata, G. Forst.
Smilax glycyphylla, Sm.
Colocasia macrorrhiza, Schott.
Cyperus lucidus, R.Br.
Nephrodium remotum, Hew.
Phegopteris punctata, Bedd.

3. INTRODUCED PLANTS.

In my paper on the Flora of Lord Howe Island (these Proceedings, 1898), I furnished a separate list of the additions to the introduced plants recorded from the Island. At pages 746 to 769 (*supra*) will be found a list of the Norfolk Island introduced plants, and no good purpose will be served by making a separate list of the species first recorded by me, as most of them are now recorded for the first time.



The following species said to be indigenous were recorded solely by Professor Tate. He did not visit the Island, and I do not know who collected the specimens referred to.

- Drimys Howeana*, F.v.M.
Boronia Barkeriana, F.v.M.
Eriostemon ambiens, F.v.M.
Eriostemon Beckleri, F.v.M.
Bosistoa euodiformis, F.v.M.
Metrosideros polymorpha, Gaud.
Olea paniculata, R.Br.
Peperomia leptostachya, Hook. et Arn.
Malaisia tortuosa, Blanco.
Smilax glycyphylla, Sm.
Pandanus Moorei, F.v.M. (a name only).

SECTION ii.

EARLY GENERAL ACCOUNTS OF THE VEGETATION.

The following accounts by Captain Cook and Lieut. King refer to the primeval vegetation of the Island, and are interesting for that reason:—

“We continued to stretch to W.S.W. till the 10th, when at daybreak we discovered land, bearing S.W., which on a nearer approach we found to be an island of good height and five leagues in circuit. I named it Norfolk Isle, in honor of the noble family of Howard. It is situated in the latitude of 29° 2' 30" S. and longitude 168° 16' East.

“We observed many trees and plants common at New Zealand, and, in particular, the flax plant, which is rather more luxuriant here than in any part of that country; but the chief produce is a sort of spruce pine,* which grows in great abundance, and to a large size, many of the trees being as thick, breast high, as two men could fathom, and exceedingly straight and tall. This pine is of a sort between that which grows in New Zealand and that in New Caledonia, the foliage differing something from both; and the wood not so heavy as the former, nor so light and close-grained as the latter. It is a good deal like the Quebec pine. For about two hundred yards from the shore the ground is covered so thick with shrubs and plants as hardly to be penetrated inland. The woods were perfectly clear and free from under-wood, and the soil seemed rich and deep.

* *Araucaria excelsa*.

“On the isle is fresh water; and cabbage palm, wood-sorrel, sow-thistle, and samphire abounding in some places on the shore, we brought on board as much of each sort as the time we had to gather them would admit. These cabbage-trees or palms (*Rhopalostylis Baueri*, J.H.M.) were not thicker than a man's leg, and from ten to twenty feet high. They are of the same genus with the cocoa-nut tree; like it they have large pinnated leaves, and are the same as the second sort found in the northern parts of New South Wales. The cabbage is, properly speaking, the bud of the tree; each tree producing but one cabbage, which is at the crown, where the leaves spring out, and is enclosed in the stem. The cutting off the cabbage effectually destroys the tree; so that no more than one can be had from the same stem. The cocoa-nut tree, and some others of the palm kind, produce cabbage as well as these. This vegetable is not only wholesome, but exceedingly palatable, and proved the most agreeable repast we had for some time” (A Voyage towards the South Pole, &c., by James Cook. London, 1777, pp. 147-150, with a map of Norfolk Isle).

“Lieut. King describes this island as one entire wood, without a single acre of clear land that had been found when the ‘Supply’ left there, and says that the pine-trees rise fifty and sixty feet before they shoot out any branches. There are several other kinds of timber on the island, which, as far as he could examine it, was a rich black mould, with great quantities of pumice stone. The trees are so bound together by a kind of supple-jack that the penetrating into the interior parts of the island was very difficult.” (Govr. Phillip in Hist. Rec. N.S.W., Vol. i. Pt. 2, p. 126).

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FERDINAND BAUER AND NORFOLK ISLAND.

The following brief notes concerning Ferdinand Bauer are taken from Lhotsky's paper. Bauer not only depicted the plants of Norfolk Island in a masterly manner, but he collected many plants, and his herbarium, with his drawings, enabled Endlicher to write his *Prodromus*. One extinct plant (*Streblorrhiza*) is now alone known from Bauer's drawings. I would that replicas of Bauer's drawings could, in the interests of science, be made for Australia. Australian botanists could thus be enabled to clear up some points.

He was appointed Natural History Draughtsman to the expedition to Terra Australis, commanded by Captain Flinders, of "H.M.S. Investigator." His salary was £300 a year, with rations for himself and servant. The E. I. Company having contributed £1200 towards the expenses of this expedition, the share which Bauer received enabled him to make his outfit as an artist very complete. It was further granted, by the Lords of the Admiralty, that all drawings executed, which were not required for publication in any work connected with the expedition, should be the artist's own property, as well as the specimens collected by him, except those that should go to the British Museum.

During his excursions from False Bay to Table Mountain, Cape of Good Hope, and those at King George's Sound, W.A., until the first arrival of the "Investigator" at Port Jackson, Bauer had completed, up to the 22nd of May, 1802, 350 sketches of

plants, and 100 of animals, etc. On quitting the latter place for Torres Straits, he writes on the 20th of July that his collection then comprised seven hundred drawings, which he had left for safety in the house of the Governor at Sydney.

Lhotsky possessed two letters of his—one written from the east coast of New Holland, when the "Lady Nelson" left the "Investigator," and the other at the period when the latter vessel had been condemned, and Captain Flinders was on his way to England. In the latter communication, which is not dated, but probably written in the middle of the year 1803, Bauer states that between the period of his starting from and his return to Sydney, he had executed designs of 500 species of plants, and 90 of animals, the latter chiefly birds. He complains in this and former communications, that the wet state of the cabins in the "Investigator," by injuring his paper, had hindered the perfect execution of his drawings. Captain Flinders having decided to go back to England, Mr. Robert Brown and Mr. Bauer awaited his return in Australia; and during this period Ferdinand visited Norfolk Island, and spent eight months there, collecting those materials used by Endlicher "*Baueri in colligendis stirpibus industriae, in desiccando dexteritati et divino plane in pingendo ingenio debetur*" (Endlicher's Preface).

At length he determined to withdraw to his native land, taking with him his most extensive collections, drawings of more than 2000 species of plants, several hundred sketches of animals, a very valuable herbarium and collection of skins, the whole occupying 14 large cases, with which he set sail from England in August, 1814.

The liberality with which Ferdinand Bauer had been treated by the English Government, in whose service he had remained, finishing the plates illustrative of the expedition up to the year 1813, enabled him, on his return to Austria, to purchase a small house at Hitzing, near Vienna, adjacent to the large Botanic Garden of Schönbrunn. Here he worked very hard in executing and completing his drawings of New Holland plants and animals,

as well as some plates of his illustrations, filling two large volumes with the former.

Bauer died on the 17th of March, 1826, in the 66th year of his age. The bulk of his collections was bequeathed to his legal heirs; but the two volumes of miniature paintings of Australian plants and animals he left to his brother Francis, by whom they were afterwards (1842) sold to Mr. Robert Brown. His herbarium and skins of animals and birds, with the sketches illustrative of them, were purchased for the Imperial Museum of Vienna; and a great many drawings, as well as copies of the Illustrationes, were still, in the year 1829, in the possession of his brother Francis at Vienna. I do not know what became of Francis' collections.

EARLY GOVERNMENT GARDENS.

Owing to the paucity of published records and to the break in continuity of settlement of the Island, it is very difficult to obtain details of the early Government gardens. The very beginning of cultivation is recounted by Lieut.-Govr. King in his official diary (Hist. Rec. N.S. Wales, ii. p. 556, *et seq.*).

From that modest record we learn that on Friday, 14th March, 1788 :—

“At noon finished delving and enclosing ye garden. Its size is 87 feet square; the soil very rich and deep. Began squaring it out and sowing ye seeds as marked in ye columns.”

Following is a list of the first seeds, &c., planted :—

“Potatoes, yams, turnips, onions, lettuce, spinage, parsley, cabbage.”

On the following Monday, viz., 17th March, the following sowing took place, viz. :—

“Potatoes, beet, early cabbage, cauliflower, cress, mustard, jibbrocoli, fennel, thyme, marjoram, shalots, sorrel, parsnips, parsley, carrots, corn sallad, lettuce, onion, Indian corn, French beans, rhubarb, 5 cocoanuts.”

On that same day the proud entry was made :—

“Turnips, radishes, cabbages and lettuces are out of ye ground.”

The island was uninhabited prior to its discovery by Captain Cook, and doubtless these humble vegetables were the first ever grown on it by the hand of man.

On the 18th March he "sowed 3 cotton-seeds on ye top of ye hill." King carefully recorded progress in those early days, as the success of the plantings was of great importance, not only to the infant settlements, but also to Sydney, which had just been founded. The first maize (Indian corn) showed itself on Sunday, 23rd March, and on 30th March, doubtless as an extra treat for Sunday, he "cut some cress and mustard for ye people; left some for seed."

This first Government garden was doubtless close to the official township, and was known as "Arthur's Vale."

I have been permitted to make, through the courtesy of Mr. F. M. Bladen, a copy of a plan of Norfolk Island, entitled, "Plan of the Settlers' lots and the ground cultivated for the Publick on Norfolk Island, 1796." It contains "Lots of ground cleared of timber for the Publick use, green." There are three "green" areas, one at the settlement (the present township), a second called "Queenboro'," now known as Longridge, and a third called "Phillipburgh," now known as Cascades.

At an earlier date (19th March, 1794, Lieut.-Govr. King reported :—

"Employed at cultivating Government ground :—At Sydney, 154 acres, 45 men. At Queensborough, 176 acres, 50 men. At Phillipsburgh, 42 acres, 18 men" (Hist. Rec. N.S.W. ii. p. 191).

pointing out that one hundred and thirteen only are employed at cultivation.

"A great quantity of Government's maize remains to be got in, and the 376 acres belonging to Government are so much overrun with high weeds, owing to the constant rains, that it would require five times that number of men to get it in any tolerable state time enough for receiving the next season's seed, which should be sown in May" (*Op. cit.* Vol. ii., p. 187).

King, on 5th Novr., 1794, reported the number of "Gardeners at public garden, Arthur's Vale, for rearing plants and preserving

seeds . . . 2"; and Gardeners at Queensborough for nursing of fruit trees . . . 2." This would of course refer to skilled labour only.

In a letter addressed by Mrs. Morrissett, wife of Col. Morrissett, Commandant at Norfolk Island, dated 5th March, 1830, to Mr. Fraser, Superintendent of the Botanic Garden, Sydney, she states :—

"We have selected a beautiful spot for our garden, about $2\frac{1}{2}$ miles from Government House, which we call the Orange Vale."

This was a fourth garden. Government House, Norfolk Island was, according to the same letter, occupied by Colonel and Mrs. Morrissett at Christmas, 1829.

Backhouse (p. 251) speaks, in 1835, of the Commandant's garden, which is situated in a beautiful hollow called Orange Vale.

The vale bears the name of Orange Vale to this day, but it has gone to ruin long ago. Approaching the Mission Station by the noble avenue of Norfolk Island Pines, one observes to the right, a second avenue of Pines descending to a gully. This is Orange Vale, but very few of the original plants (other than the Pines) are in existence now.

Backhouse goes on to say :—

"Much of the land was formerly cultivated, but this is now overrun with the Apple-fruited Guava, and the Lemon, which were introduced many years ago, when the Island was settled, with a view to its becoming a granary to New South Wales. Grape vines, figs, and some other fruits have also become naturalised. In the garden at Orange Vale, coffee, bananas, guavas, grapes, figs, olives, pomegranates, strawberries, loquats and melons are cultivated successfully. Apples are also grown here, but they are poor and will not keep."

At p. 264 he goes on to say :—

"Accompanied by the Agricultural Superintendent, we walked to a stock-station, called Cheeses Gully, on the north side of the Island, where three men are placed in charge of some cattle, feeding on grassy hills, embosomed in wood, and partially overgrown with Lemon and Guava-trees."

I do not know whether the name Cheese's Gully is still in use.

There are the remains of the old Government Garden at the Cascades (Phillipsburgh) on Mrs. Young's land. It is a wreck of a garden now mostly under Sweet Potatoes, but some of the original trees are still in existence. For example, we have a huge Moreton Bay Fig whose surface or buttress roots spread out seventy (70) feet across. There are also huge Olive-trees, eleven feet at spread of roots; a *Pittosporum undulatum* thirty inches in diameter, and some very large Moreton Bay Chestnuts (*Castanospermum australe*).

I also noticed in this old garden, Yuccas, a Rose Apple, Pomegranate, a Coral-tree (*Erythrina*), a Guava forest, an edible Fig, *Arundo donax*, Peach, Mulberry, the Blue Guava (*Psidium Cattleianum*), a Lisbon Lemon, Candle-nut tree (*Aleurites*), and a Cherimoyer. There are also the remains of a gardener's cottage, built of stone, and on its ruins and about the Indian Shot, the Passion Vine, and a tall Lima Bean are growing in the greatest profusion.

PHILLIP ISLAND.

On 2nd Decr., 1788, Lieut.-Govr. King wrote as follows :—

“ At 6 a.m. I went in the coble to Phillip's Isle, where I landed on a rock in Collin's Bay at half-past seven, and climbed up the hills, which I found a fine rich red clay. A valley in the form of a half-moon runs round the hills over Collin's Bay, and is, as well as the hills, wooded but not thick. I do not suppose that there are above 150 pine trees on the whole island. Most of the hills are covered with a thick entangled kind of reed (perhaps *Cyperus hæmatodes*, Endl., J.H.M.) which only wants burning to clear away 100 acres of ground, which would make a fine wheat land, if not too dry ” (Hist. Rec. N.S.W., ii. p. 601.)

Allan Cunningham botanised on the Island (which by the way was termed Pig Island by Bauer, by reason of those animals being placed there), and he gave an account of his trip (London Journ. Bot. i. 113-120), which was sadly interfered with owing to his having been marooned there by his convict attendants. His account of the vegetation is the best that has been preserved, and is particularly valuable because the Island, though small, contained some endemic species, and because, as already hinted, the Island has, through the depredations of animals, been

since reduced almost to the condition of a bare rock. Owing to the weather not being favourable I was unable to visit Phillip Island. Following is Allan Cunningham's account of the vegetation :—

“The interior presents some deep hollows, in parts densely wooded with small trees, and an underwood, chiefly of the thorny Caper bush (*Busbeckia nobilis*), bearing fruit like a green lemon, and very difficult to travel through” (*Op. cit.* p. 114).

“Of the plants, I have to remark that they were, with but few exceptions, the same as those of Norfolk Island. Among them were a species of *Hibiscus* (*H. insularis*, Endl.), which has a suffruticose, spinous stem, bore decayed yellowish flowers, appearing not to differ from a plant found at Port Macquarie. I collected flowering specimens of *Blackburnia pinnata*, not previously met with in that state, and also of *Capparis citrina*, A. Cunn. MSS. (*Busbeckia nobilis*, Endl.), and the ripe fruit of *Mimusops laurina*, A. Cunn. MSS. (*Achras costata*, Endl.), which being produced in abundance, afford considerable provender for the pigs. In the shades, I detected a dark, glossy, pinnated-leaved twiner; it appeared to be an undescribed species of *Clitoria* (*Clianthus Baueri*, A. Cunn. MSS.”) *Ib.* p. 115.

“After pushing our way through some brushes of Caper, [we] entered a thick, close wood, in which *Croton sanguifluum* (*Baloghia lucida*, Endl.), *Hibiscus Patersonii* (*Lagunaria Patersonii*, G. Don), *Myoporum obscurum*, Forst., *Blackburnia pinnata*, Forst., the large Piper (*P. psittacorum*, Endl.), and *Olea apetala*, Vahl, were very frequent. This latter I found in flower and young fruit, and was, therefore, fully enabled to establish its identity with Forster's plant, originally found by that botanist in New Zealand. The *Coccoloba australis* (*Polygonum australe*, A. Rich.) which I formerly detected on the sandy shores of the Bay of Islands, I also met with, in open situations, but not in fructification. On the southern and western sides of the Island, where more particularly I directed my walk, I observed on grassy spots, *Commelina cyanea*, R. Br., *Solanum nigrum* (?), *Plumbago zeylanica*, with the purple flowering *Dolichos* (*Canavalia Baueriana*, Endl.), bearing its pods, which are tricarinated on their upper edge. A few blighted trees of *Araucaria* stood detached from each other in open exposed situations, but not a single tree fern was met with in the deep gullies we descended, where only two species of *Filices*, so frequent on the large Island, were remarked” (*Ib.* p. 116).

Following appear to be the endemic species :—

Hibiscus insularis, Endl.

Streblorrhiza speciosa, Endl.

Solanum Baueriana, Endl., the fruit of which was described to me as "like a bright red elongated tomato."

Triticum Kingianum, Endl.

NEPEAN ISLAND.

A smaller island than Phillip, Nepean Island by name, is quite close to Norfolk Island and is grass-covered, with one solitary weather-beaten Norfolk Island Pine upon it. It is covered with grass and has no running water. It is about fifty feet high, a quarter of a mile long, and is of a horse-shoe shape.

Lieut.-Governor King wrote as follows concerning it on the 29th November, 1788 :

"At 9 a.m. I went out in the coble and landed on Nepean's Isle, which I found a lump of entire sand; which is kept together by a border of rocks. Notwithstanding the deep sand, this island produces near two hundred very fine pines" (Hist. Rec. N.S.W., ii. p. 600.)

EXPLANATION OF PLATE XXXVIII.

Dysoxylon Patersonianum, Benth. & Hook. f.

Fig. 1.—Epidermis paginæ superioris.

Fig. 2.—Epidermis paginæ inferioris.

Fig. 3.—Foliolum cum nervo laterali transverse sectum (160 × auctum).

a. Epidermis paginæ superioris; *b.* Hypoderma; *c.* Staurenchyma (Palisades); *d.* Pneumatenchyma; *e.* Epidermis paginæ inferioris; *f.* Cellulæ hypodermatis rostralophoræ; *g.* Cellulæ pneumatenchymatis; *h.* Cellulæ secretoriæ (resiniferæ); *i.* Fasciulus vasorum longitudinaliter sertus; *k.* Fasciulus vasorum transversim sertus; *l.* Stomata; *mm.* Insertiones glandularum decisarum (L. Radlkofer).